USER GUIDE

# MA 210.5Y.IC.WH

Radwag

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# User manual

**IMMU-197-04-12-24-EN**

# MA 5Y
# Moisture Analyzers

Moisture Analyzers MA 5Y
Moisture Analyzers MA 5Y.IC

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Thank you for choosing and purchasing the RADWAG moisture analyser.
The product has been designed and manufactured to serve you for many years.
Please read this manual to assure its reliable operation.

DECEMBER 2024

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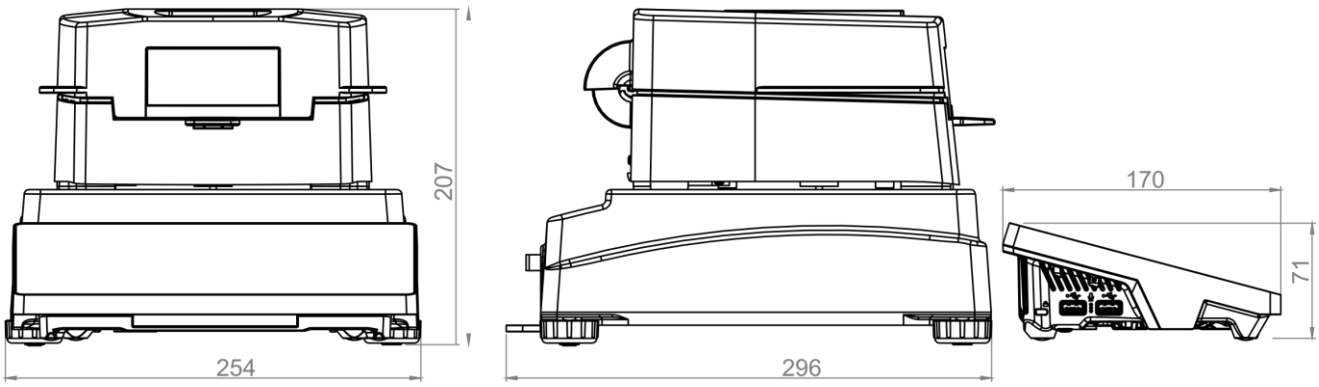
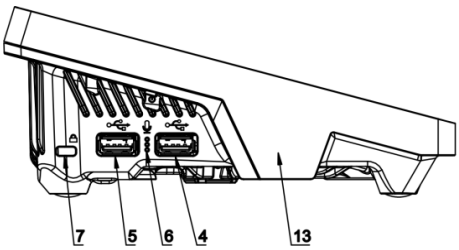
# 1. BASIC INFORMATION

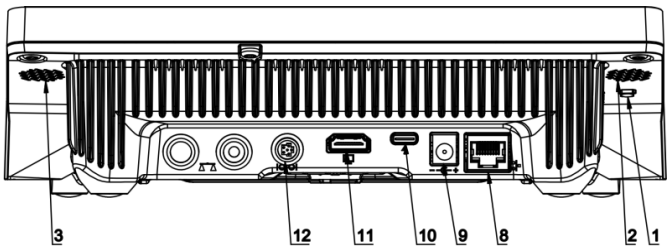
## 1.1. Dimensions

See below for dimensions:

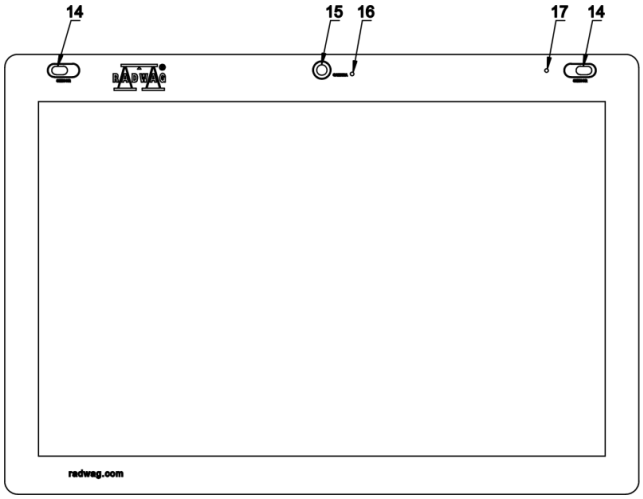



## 1.2. Description of ports




Top view




| | | | |
|---|---|---|---|
| ***1*** | Hard reboot or off/on key | ***10*** | Power port – USB type C |
| ***2*** | Left speaker | ***11*** | HDMI port |
| ***3*** | Right speaker | ***12*** | Media box (RS232) port |
| ***4*** | USB type A port | ***13*** | RFID sensor |
| ***5*** | USB type A port | ***14*** | Reflective sensors |
| ***6*** | Microphone | ***15*** | Camera |
| ***7*** | Kensington Lock | ***16*** | Camera light |
| ***8*** | Ethernet port | ***17*** | Signalling light |
| ***9*** | Power port | | |

## 2. TECHNICAL DATA

### TECHNICAL PARAMETERS

| **Moisture analyser type** | **MA 50/1. 5Y.A** | **MA 50. 5Y.A** | **MA 110. 5Y.A** | **MA 210. 5Y.A** |
|---|---|---|---|---|
| | **MA 50/1. 5Y.IC.A** | **MA 50. 5Y.IC.A** | **MA 110. 5Y.IC.A** | **MA 210. 5Y.IC.A** |
| Max. load | 50 g | 50 g | 110 g | 210 g |
| Reading unit | 0,1 mg | 1 mg | 1 mg | 1 mg |
| Tare range | - 50 g | - 50 g | - 110 g | - 210 g |
| Max. sample mass | 50 g | 50 g | 110 g | 210 g |
| Humidity readout precision | 0,0001% | 0,001 % | | |
| Humidity repeatability | +/- 0,05% (sample ~2g), +/- 0,01% (sample ~10g) | | | |
| Drying temperature range | Max. 160 °C<br>Max. 250 °C (WH) | | | |
| Heating unit | Infrared emitter (NP)<br>halogen (NH or WH)<br>heater in a metal cover (NS) | | | |
| Drying method | 4 drying profiles: standard, fast, stepwise, mild | | | |
| Drying termination methods | 4 modes: automatic, time-defined, manual, user-defined | | | |
| Working temperature | +10 °C - +40 °C | | | |
| Power supply | 230V AC 50/60Hz | | | |
| Display unit | 10" graphic colour touchscreen | | | |
| Weighing pan dimensions | Φ 90 mm, h = 8 mm | | | |
| Drying chamber dimensions | 120 x 120 x 20 mm | | | |
| Net/gross weight | ~5,3 / 6,8 kg | | | |
| Packaging dimensions | 470×380×336 mm | | | |
| Moisture analyser power | 6W during weighing<br>max. 450W during drying | | | |
| Protection rating | IP 43 | | | |
| Overvoltage category | II | | | |
| Pollution category | 2 | | | |

All moisture analysers are equipped with an automatic opening and closing mechanism of the drying chamber.
MA xx. 5Y.IC.A moisture analysers are also supplied with an automatic internal mass adjustment/calibration mechanism.

# 3. BASIC SAFETY NOTES

## 3.1. Signal and warning symbol definitions

All safety notes are marked with special descriptions and warning symbols. They inform the operator about potential hazards and warn him about danger.
Ignoring safety notes may lead to bodily injuries or damage to the moisture analyser, device malfunctioning and erroneous measurements.

### 3.1.1. Warning descriptions

**WARNING** A moderate-level risk situation that may result in serious bodily injuries or death.

**CAUTION** A low-level risk situation that may result in damage to the device or its functions, loss of data, as well as minor or moderate bodily injuries.

**NOTE** Important information on the moisture analyser.

### 3.1.2. Warning symbols

Electric shock

Acid/corrosion

General danger

Inflammable or explosive substances

Toxic substances

Hot surface

Crushed hand

## 3.2. Safety principles

**WARNING:**
Using the moisture analyser at variance with safety principles and operating manual may pose a threat to health or life.

**WARNING:**
The rated voltage of the moisture analyser is 230 VAC. Therefore it is required to use the moisture analyser in accordance with safety principles applicable to low-voltage equipment. The moisture analyser is supplied with a three-core power cable, equipped with a grounding pin. In case it is necessary, an extension cable that meets relevant standards and is equipped with earthing can be used. It is forbidden to disconnect the grounding cable intentionally.

**CAUTION:**
In the place of use, the distance around the moisture analyser must allow for proper air circulation (ca. 20 cm around and ca. 1 m above the device) in order to prevent accumulation of heat or device from overheating.
Ventilating holes in the housing must not be covered, sealed or otherwise blocked.
No inflammable substances must be placed on or near the moisture analyser.
It is necessary to remain highly careful when taking the sample out. The sample, drying chamber, covers and weighing pan which the sample is located on can be hot.
If the interior of the chamber must be maintained (cleaned), switch the device off and wait for all elements to cool down before you perform the aforesaid works.
It is forbidden to make any modifications in the heating module.

**Some kinds of samples require the operator to remain highly careful.**
They can pose a threat to people and things. The operator must elaborate his own drying guidelines for hazardous and inflammable substances. The responsibility for potential damage arising from use of a specific type of samples is always attributable to the operator.

**CAUTION:**
**Corrosion:** There are substances that emit corrosive vapours (e.g. acids) when heated. In this case use small samples because steam may accumulate on cooler parts of the housing and prove corrosive.

**WARNING:**
**Fire or explosion:** Inflammable and explosive substances, the ones that contain solvents or emit inflammable or explosive gases when heated. If the nature of the sample is doubtful, before you initiate the proper test, carry out of the risk analysis. For such samples, use low drying temperatures in order to prevent flames or explosion. When testing, wear protective glasses and gloves. The samples must be small enough.
**When testing such samples, the equipment must never be left unattended!**

**WARNING:**
The substances with toxic or caustic ingredients: The substances that emit toxic gases or steams when dried may irritate (eyes, skin or respiratory tract), may cause diseases, or even lead to death. They can be dried only in the fume hood.

**WARNING:**
Moisture analysers are equipped with a mechanism serving to close/open a cover of the drying chamber. For this reason it is necessary to remain careful while working with the device in order to secure oneself against hand crushing when closing/opening the cover of the drying chamber.

**WARNING:**
In case of any symptoms of burning (smoke, burning noise, flame), switch the device off, wait for at least 10 minutes and then open the chamber if the aforesaid symptoms have stopped. If they persist or it is suspected that they persist, wait for another 10 minutes. If the situation escalates or does not cease for a long time and it is not possible to stop it, unplug the device immediately and follow the applicable fire prevention rules.

**WARNING:**
Any hazardous phenomena detected in the device must be immediately reported to RADWAG service centres.

**Never use the product in an explosive atmosphere.**
**The moisture analyser is not suited for operation in explosion hazard zones.**

### 3.3. Disposal

It is necessary to dispose of the device and its packaging in accordance with rules of law that apply in the specific area or in the specific country.

### 3.4. Intended use

The moisture analyser is used to specify the relative humidity of small samples of various materials, specify the dry mass of small samples of materials, and measure the mass of loads subject to weighing.
It assures quick and precise determination of water content in the sample in question, while a touch screen substantially helps the operator to use the device and make measurements.
The moisture analyser can be used to determine moisture content in various materials.
At the beginning of the measurement, the device determines the exact mass of the sample located on a cross, and then heats the sample quickly to trigger evaporation of the moisture contained in the material sample.
During evaporation, the moisture analyser keeps on checking the loss of mass in the sample in question, simultaneously recalculating the input data and displaying the moisture content results.
When compared to conventional moisture content determination methods, the moisture analyser assures shorter measuring time and easier testing procedure.
Thanks to the moisture analyser, it is possible to set numerous parameters that determine the moisture determination procedure (e.g. power, time, drying profiles, etc.).

### 3.5. Conditions of use

**Note!**
Do not open the drying chamber while testing. The moisture analyser is equipped with a halogen lamp that emits intensive heat. Therefore it is necessary to watch pieces of the moisture analyser that get hot during testing (disposable weighing pan, weighing pan holder and internal covers of the drying chamber). Please remember that some tested materials may become dangerous in view of heating (emergence of poisonous vapours, ignition or explosion risk).

The moisture analyser must not be used for dynamic weighing. Even if small amounts of the product are removed or added to the material in question, the weighing result must be read only after the stability sign ◣◢ has showed up.
Do not put magnetic materials on the weighing pan as it may damage the measuring system.

Do not exceed the maximum loading capacity of the weighing pan under dynamic loading and the moisture analyser under overloading. Please remember that the tare mass (e.g. a container on the weighing pan) must be considered (removed from the weighing pan loading capacity).

Never use the moisture analyser pan in the explosive atmosphere!
The moisture analyser is not suited for operation in ex zones.
It is forbidden to make any structural modifications in the moisture analyser.

### 3.6. Safe use principles

The moisture analyser meets all applicable safety regulations, yet may cause hazards in extreme circumstances.
It is forbidden to open the device housing while drying. There are no internal parts that can be maintained, repaired or replaced by the operator. In case of any problems, contact the RADWAG service engineers or distributor immediately.
Always use the device in accordance with this manual and carefully follow its guidelines on installation and configuration of a new device.
Using the moisture analyser at variance with safety principles or operating manual may pose a threat to health or life. For this reason read the safety principles specified in the manual:

- Use the moisture analyser only to determine moisture content in samples or to check the mass of samples in question. Any other use of the moisture analyser may pose a threat to personnel or device itself.
- Before activating the device, make sure the supply voltage showed in the rating plate complies with the power voltage which the product is to be connected to.
- **Only an authorised service technician is allowed to replace an IR emitter or halogen.**
- Secure the moisture analyser against any liquids as it may lead to electric shock, fire, emission of toxic, caustic or explosive substances.

### 3.7. Guarantee

The guarantee does not cover the following:

- failure to follow provisions of the operating manual,
- use of the moisture analyser at variance with intended use,
- modifications of the moisture analyser or opening of the housing (destroyed securing labels),
- mechanical damage and damage caused by mediums, liquids, water and natural wear,
- improper setup or defects of the electric system,
- measuring mechanism overloading.

### 3.8. Supervising metrological parameters of the moisture analyser

All metrological properties of the moisture analyser must be checked by the operator at preset time intervals. The frequency of checking results from environmental factors of the moisture analyser, type of weighing procedures and the quality management system.

### 3.9. Information in the manual

Before you switch the moisture analyser on and then activate it, please read the operating manual carefully; even if you are experienced in using such moisture analysers.

## 3.10. Personnel security

The moisture analyser must be operated and supervised only by trained people, experienced in using such equipment.
To use the moisture analyser, at first get familiar with the operating manual. Keep the manual for future reference.

It is forbidden to make any structural modifications in the device. The additional equipment that can be connected to the device and spare parts must be supplied by RADWAG or an authorised distributor.

### 3.10.1. Protective clothing

While working with the device, it is advisable to use protective clothing in order to secure yourself against potential hazards related to tested substances and their ingredients.
While testing, the following items must be used:

- protective apron,
- protective glasses,
- protective gloves (intended for dangerous chemicals).

Before you take the aforementioned protective measures, make sure they are suitable for particular preparations and are not damaged.

# 4. TRANSPORTATION AND STORAGE

## 4.1. Delivery inspection

Inspect the delivered packaging and device immediately after the delivery. Check for any outer signs of damage.

## 4.2. Packaging

Keep all pieces of the packaging for potential transportation of the moisture analyser in the future. Only original packaging of the moisture analyser can be used for shipping. Before packing, unplug all cables and remove moving parts (weighing pan, covers, inserts). Place all pieces of the moisture analyser in the original box and secure it against damage during transportation.

# 5. UNPACKING, INSTALLATION AND INSPECTION OF THE DEVICE

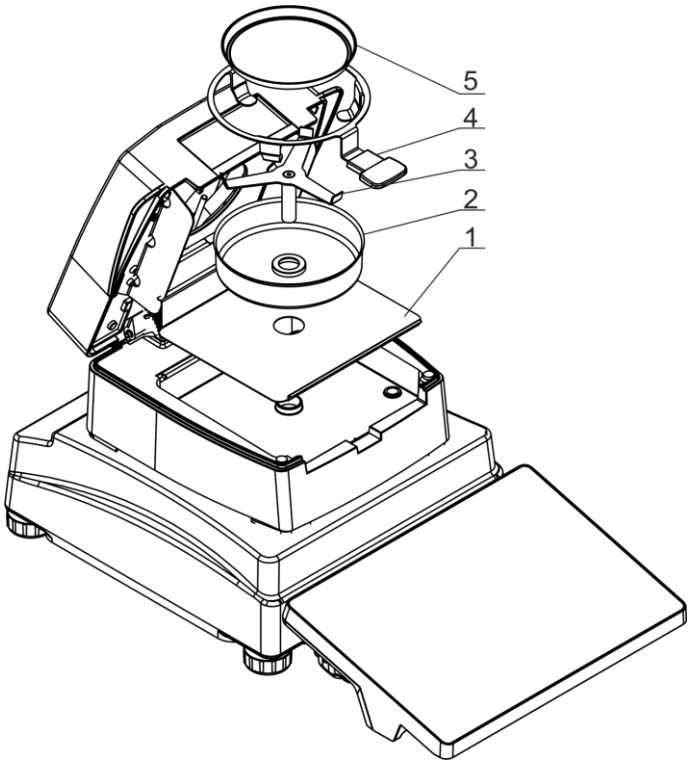
## 5.1. Place of installation, place of use

- Store and use the moisture analyser in rooms that are free from vibrations and shocks, draughts and dust, located at the height of up to 2000 m above see level.
- The place of use must be located at a distance that guarantees good air circulation around the moisture analyser (ca. 20 cm around and ca. 1 m above the equipment).
- The air temperature in the room must be: +10 °C ÷ +40 °C.
- The relative humidity must not exceed 80% at the temperature of up to 31 °C, descending linearly to 50% of relative humidity at the temperature of 40 °C.
- The moisture analyser must be positioned on the wall bracket or stable table that is not subject to vibrations, and away from sources of heat.
- In the place of use, the device must be positioned in a way that assures easy access to the power plug and allows its potential disconnection.
- Pay special attention to weighing of magnetic materials as a strong magnet is an integral part of the moisture analyser.

## 5.2. Unpacking

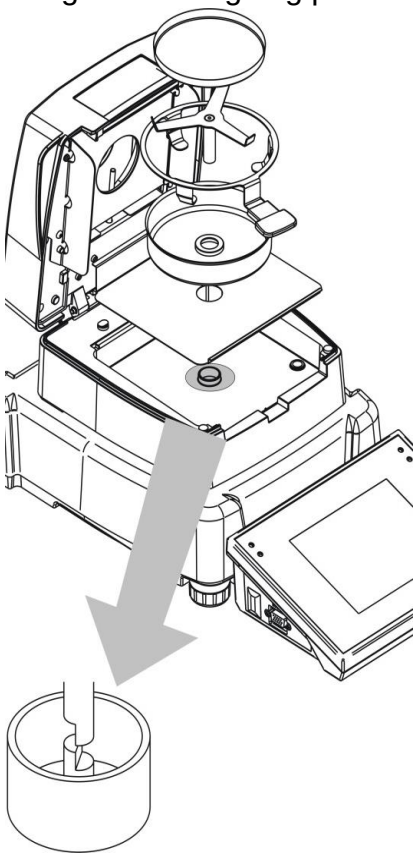
Carefully take the moisture analyser out of the box, remove the foam cover and gently put the device in a desired place of use. Take particular pieces of equipment out of boxes and install internal elements as per the following diagram:

Installation of components of the moisture analyser:




Install the chamber base insert (1).
Install the drying chamber cover (2).
Install the weighing pan cross (3).
Install the weighing pan holder (4).
Install the disposable weighing pan (5).

Positioning of the weighing pan cross:



When installing the cross of the weighing pan, pay special attention to the location of a shank. The shank comes with a special cut-out for clear position of the cross in relation to the weighing pan holder, which prevents the contact.

How to set the weighing pan cross:
- after installing the cross on the shank, gently rotate the cross so that the cut-out on shanks is in a suitable position,
- rotating the shank, remain gentle in order not to damage the mechanism of the moisture analyser.

### 5.3. Setup

The moisture analyser is supplied with an electronic level (no outer level). After running the program, go to the levelling procedure and level the moisture analyser.
The method of levelling can be found further in the manual (point 16.3).

## 5.4. The list of standard delivery items

- Moisture analyser.
- Chamber base insert.
- Chamber cover.
- Weighing pan grip.
- Weighing pan cross.
- Disposable weighing pan.
- Power cable.
- Protective cover.

## 5.5. Connection to the network (mains)

**The moisture analyser can be supplied with power only with the use of an original power cable supplied. The rated voltage of the equipment (given in the rating plate) must correspond to the rated voltage of the mains.**
**The position of the device in the place of use must guarantee easy access to the power plug and its potential disconnection.**
The power cable can be connected only to the port with a protective contact. To supply power to the moisture analyser, insert the plug of the power cable into the port at the back of the housing.

## 5.6. Connection of additional equipment

Before connecting or changing the additional equipment (printer, PC), unplug the moisture analyser. Only the additional equipment that has been recommended by the moisture analyser manufacturer can be connected. After connecting devices, you can supply power to the moisture analyser.

*NOTE:*
*Only SELV (Safety Extra-Low Voltage) and limited Energy devices can be connected to the moisture analyser interfaces.*

# 6. DEVICE OPERATION AND MAINTENANCE

This section of the manual provides a description of how to keep the device operational and how to replace defective elements (fuses).

## 6.1. Cleaning agents and methods of cleaning various components

**Please remember to disconnect the moisture analyser from the supply voltage before you start cleaning works.**

To safely clean the product, please do as follows in the specific order: disassemble the weighing pan and other moving elements of the moisture analyser; depending on the type of product (see description in the point: UNPACKING AND INSTALLATION). The steps must be taken with care in order not to damage the mechanism.

***Note:***
*If the place of use is heavily dusted, it is advisable to entrust the RADWAG service technician with a task of inspecting the moisture analyser once per 6 months.*
*If the weighing pan is installed and cleaned at the same time, the product may get damaged.*

**Cleaning ABS elements**

To clean dry surfaces, it is necessary to use clean cellulose or cotton cloths that do not leave streaks and do not dye. You can also use water and cleaning agent (soap, dishwashing liquid, window cleaner). For optimal cleaning, regularly press the cloth against the surface, wipe the cleaned area, and dry afterwards. You can repeat the cleaning procedure, if necessary.

In case of stubborn dirt, such as glue, rubber, tar, polyurethane foam, etc., you can use special cleaning agents based on aliphatic hydrocarbons that do not solve the material. Before using the cleaning agent, it is recommended that you should conduct a fitness test. Do not use abrasive agents.

**Cleaning glass elements**

Depending on the type of dirt, a suitable solvent must be chosen. Never immerse glass in strong alkaline solutions because glass can be damaged by these solutions. It is forbidden to use abrasive agents.

In case of organic residues, acetone must be used. Only in a next step can you use water and detergent. With regard to non-organic residues, thinned acid solutions (soluble hydrochloric or nitric acid salts) or bases (mostly sodium, ammonium) are permitted.

ACIDS must be removed with basic solvents (sodium carbonate), while BASES with acidic solvents (mineral acids of various concentration).
In case of stubborn dirt, use a brush and detergent. Avoid the detergents with large and hard particles as they may scratch the glass.

At the end of the washing procedure, carefully rinse the glass with distilled water.
Always use soft brushes with a wooden or plastic grip to avoid scratching. Do not use wire brushes or wire-core brushes.

The rinsing procedure is required to make sure all soap, detergent and other cleaning agent residues are removed from glass products before they are reassembled in the product.

After initial cleaning, glass elements must be rinsed under running water, and distilled water afterwards.

It is not advisable to dry the glass with a paper towel or forced air stream because it may pollute glass elements with fibres or other contaminants, and eventually lead to erroneous weighing results.

For measuring glassware, do not use electric dryers.
As a rule, after washing, glass elements are positioned on the shelf for free drying.

**Cleaning stainless steel elements**

While cleaning stainless steel elements, follow the table below. The table shows types of pollutants and methods of eliminating them.

| *Type of pollutant* | *Elimination method* |
|---|---|
| Fingerprints | Wash with spirit or solvent.<br>Rinse with pure water and wipe it dry. |
| Oils, fats, greases | Wash with organic solvents and then warm water with soap or soft detergent.<br>Rinse with pure water and wipe it dry. |
| Stains and blooms | Wash with a soft scrubbing detergent. Clean gently as per surface structure direction.<br>Wash with pure water and wipe it dry. |
| Strong discolouration | Clean with a detergent as per cleaning direction. The following cleaning materials will prove perfect: brushes with natural hair and synthetic hair, brushes with microfibres, chemical and natural fibres, plastic cloths, spongy cloths, sponges.<br>Rinse with pure water and wipe it dry. |
| Traces of rust | Moisten with oxalic acid solution and leave for about 15-20 minutes. Then wash with warm water and soap or soft detergent.<br>Rinse with pure water and wipe it dry. |
| Paints | Wash with paint solvent, and then wash with warm water and soap or soft detergent.<br>Rinse with pure water and wipe it dry. |
| Scratched surface | Gently polish with unwoven fabric (iron-free) as per surface structure direction, and then wash with a soft scouring detergent. Rinse with pure water and wipe it dry. |

**Cleaning powder-painted elements**

The first step is preliminary cleaning under running water or with a large-pore sponge and a large amount of water in order to remove loose and major dirt. Do not use abrasive agents.
Next, using a suitable cloth and water-cleaning agent solution (e.g. soap, dishwashing liquid), clean the surface by applying a regular pressure of the cloth against the surface of elements. Do not use only a detergent to clean it dry as it may damage the coating. Use a large amount of water, or water together with a cleaning agent.

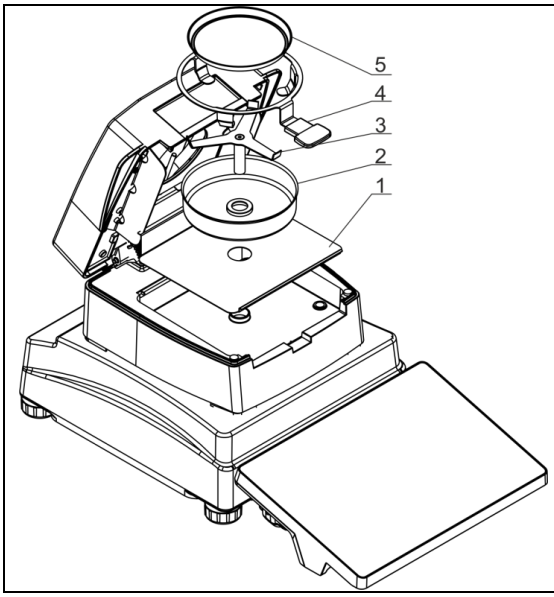
**Cleaning aluminium elements**

To clean aluminium, use products rich in natural acids. The following agents will be perfect: synthetic vinegar, lemon. It is forbidden to use abrasive agents. Avoid rough brushes that may easily scratch the surface of aluminium. A soft microfibre cloth will be the best choice. Polished surfaces must be cleaned by making circular movements. After removing dirt from the surface, polish the surface with a dry cloth to dry the surface off and make it shine.

### 6.2. Moisture analyser cleaning

To make sure measurements are precise, keep the device clean.
When cleaning the moisture analyser, it is necessary to follow tips specified in this section of the manual.

**Before starting any cleaning works, deactivate the moisture analyser by pressing the ON/OFF key and disconnect the power cable from the socket!**

| | |
|---|---|
|  | Open the lid of the moisture analyser and remove all pieces:<br><br>disposable weighing pan (5),<br>weighing pan holder (4),<br>cross (3),<br>chamber cover (2),<br>chamber base insert (1). |

All dried material residues that have fallen from the weighing pan and stay in the drying chamber may ignite during further drying procedures. Therefore you need to keep the drying chamber clean.
While cleaning particular elements, follow guidelines presented in the point 6.1 of the manual.

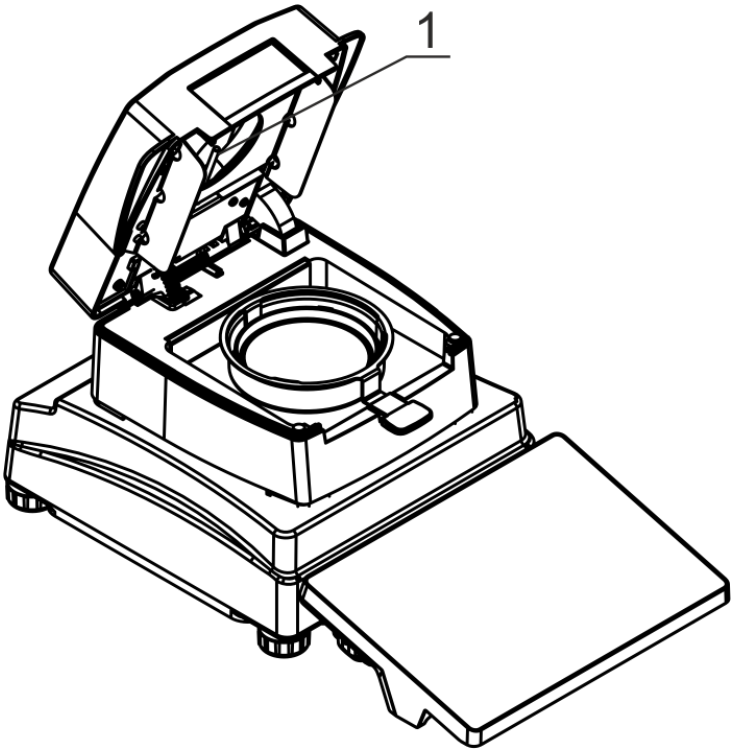
After cleaning, dry particular components off carefully.
Do not let any impurities or liquids enter the interior of the moisture analyser.
Fix cleaned parts in the device as per the diagram.

### 6.3. Temperature sensor cleaning

To ensure correct temperature readout during testing, special attention must be paid to cleanliness of the temperature sensor.
All cleaning works must be performed with special regard to safety precautions.

**Before starting any cleaning works, deactivate the moisture analyser by pressing the ON/OFF key and disconnect the power cable plug from the socket!**

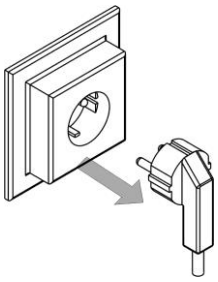
For the purposes of cleaning, you can use a soft fabric and soft cleaning agents. Do not use any abrasive agents or the ones that contain solvents as they may damage the sensor.



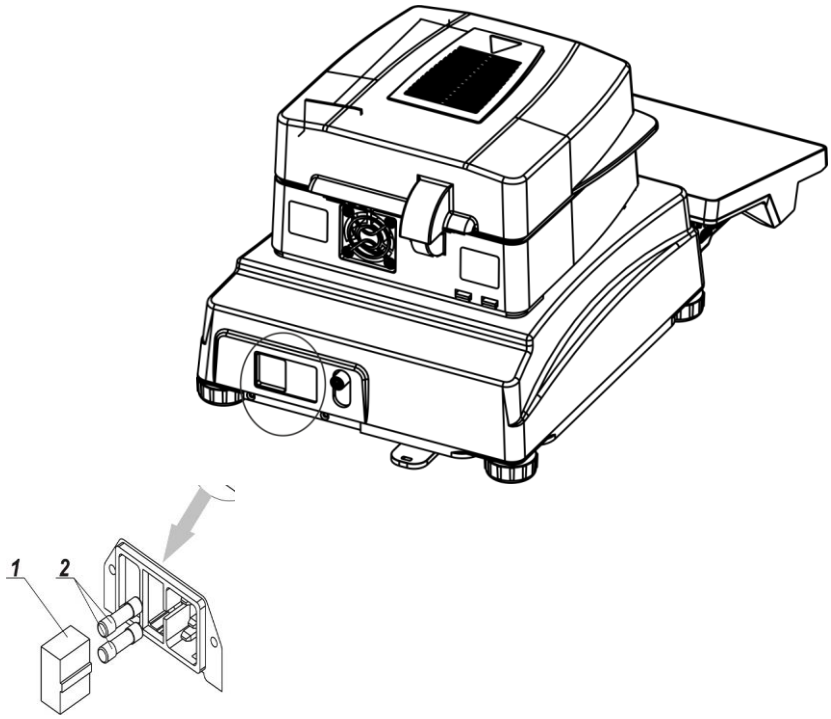

While cleaning, it is forbidden to touch a halogen lamp to avoid damage.
It is allowed to clean a halogen cover, if necessary.
While cleaning particular elements, follow guidelines in the point 6.1 of the manual.
Remember to check temperature sensor readout at least twice a year and, if necessary, calibrate the sensor.
The description of the above-stated works has been included in the ADJUSTMENT (CALIBRATION) section.

### 6.4. Fuse replacement

If the signalling light does not go on after supplying power to the moisture analyser (no reaction on the screen), it may suggest that one of the fuses (or both) has (have) blown.



**Before starting any works, deactivate the moisture analyser by pressing the ON/OFF key and disconnect the power cable plug from the socket!**




The moisture analyser is equipped with two **time-delay (T) glass tube fuses 5x20; 3.15A 250VAC**, that secure electronics of the device.

**How to replace a fuse:**

1. Remove a fuse base (1) from the mounting that is located next to the cable port.
2. Remove a fuse or fuses (2) from the base.
3. Replace the fuse or fuses with new equivalents.
4. Put the base into the mounting.
5. Supply power to the moisture analyser.

# 7. ACTIVATION

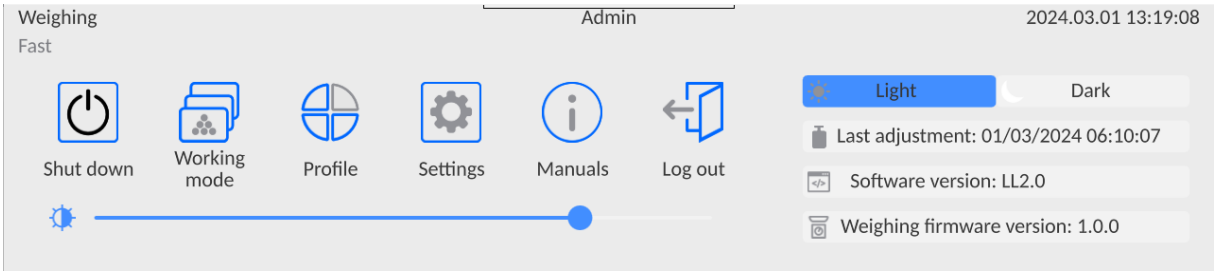
- After connecting the power cable to the socket, supply power by pressing the main key located next to the power port, at the back of the housing.
- After a while, the operating system and RADWAG software will start loading. While the software is activating, the signalling light and LED light situated at the bottom frontal part of the readout head will be flashing.
- Once the start-up procedure has ended, the software home screen will pop up.
- The product enters the unlogged mode (no operator) upon start-up. To start working, you need to log in (the logging procedure is described further in the manual).

| | |
|---|---|
| *If the software crashes during operation, perform the so-called hard reboot. To do so, press and hold the key in the product head for about 5 seconds. The software will restart and the device will reactivate.* | |

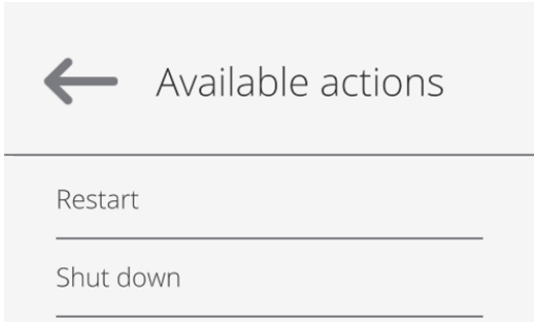
## 7.1. How to properly turn off the scale's power supply

**Procedure:**

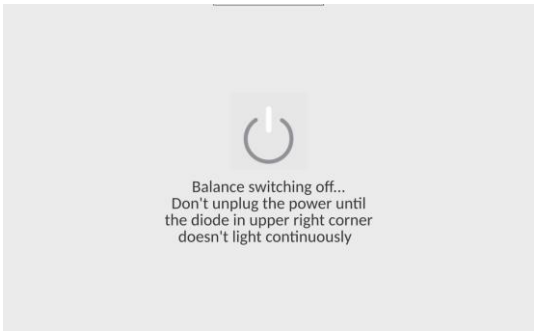
1. Expand the top scale menu




2. Press the <Off> buton.




3. Select <Off>, the message below will be displayed.



4. After closing the program, the LED in the upper right corner of the display will light up continuously.
5. Only then can you turn off the power using the main switch and disconnect the power cord from the device.

### 7.2. Moisture analyser temperature stabilisation time

Before any measurements are made, wait for the device to stabilise thermally (the temperature of the room which it will operate in). This is the so-called own heating time. If the product has been stored at a way lower temperature before being supplied with power (e.g. in winter), the product needs about 8 hours to adjust. Only after this period of time can you connect the device to the socket. While the device is stabilising thermally, the readout values may change. It is advisable to make sure the temperature fluctuations and changes are minor and very slow in the place of using the moisture analyser.

### 7.3. Emergencies

| Symptoms | Potential cause | Solution |
|---|---|---|
| No reaction after switching on. | - no power voltage,<br>- power cable damaged,<br>- device fuse damaged, | Unplug the power cable. Check the cable visually for condition of plugs and make sure the insulation is intact. Replace the device fuse. |
| Moisture analyser does not activate. | Power cable is damaged or wrongly connected. | Unplug the power cable. Check the cable visually for condition of plugs and make sure the insulation is intact. If no damage is found, reconnect after about 10 seconds. |
| Drying procedure does not start. | The lid is not properly closed. | Press the lid against the chamber towards the base until you can hear a distinctive click. |
| Bars on the mass display. | If this condition remains for more than 15 seconds, it means that the mass measurement signal is not stable for one of the following reasons: mechanical vibrations of the floor, substantial air blows, mechanical dirt within the weighing pan, strong tilting of weighing pan, device damage | |
| Too long awaiting time for end of drying | Wrong selection of the drying end criterion | Select right ending criterion experimentally |
| Measurements are not repeatable | Heterogeneous sample composition | Prepare samples from a larger amount of test material – make sure the surrounding conditions comply with requirements of this manual. |

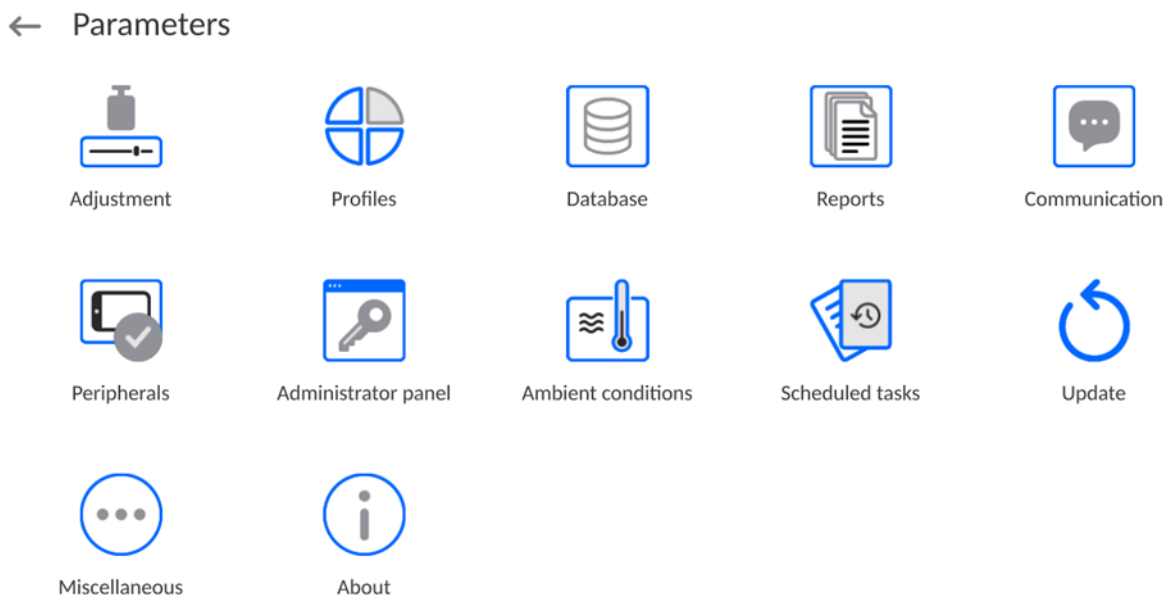
| | | |
|---|---|---|
| | Too short testing time | Change testing end criterion |
| | Drying temperature is too high and causes the sample to oxidise | Reduce drying temperature |
| | Temperature sensor is dirty or damaged | Clean temperature sensor |
| | Table which the moisture analyser stands on is unstable | Change location of the device, surrounding conditions do not comply with requirements (vibrations, draughts) |

## 8. PROGRAM STRUCTURE

The main menu of the program has been divided into functional groups. Each group contains parameters grouped by themes. The description of each group can be found further in the manual.

**The list of menu groups - Parameters**

To gain access to the main menu, press in the lower bar of the screen.
The menu contains parameters related to product settings, functions and profiles.

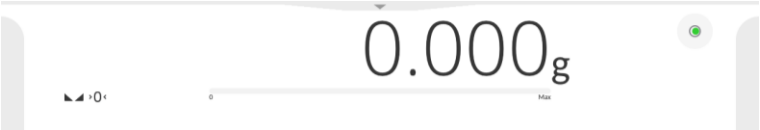


# 9. WEIGHING WINDOW

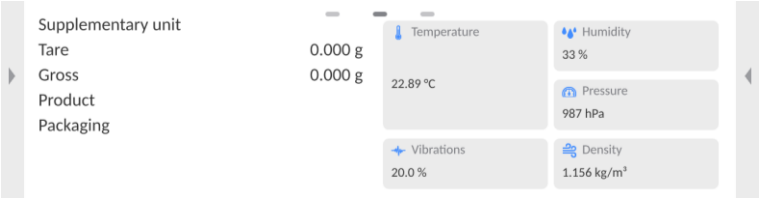
**The home screen of the application can be divided into 5 fields:**

- The top part of the screen shows information on currently used working mode, logged operator, date, time, active connection to PC.

- The window below shows the weighing result and moisture analyser levelling.




- The field contains additional information related to ongoing operations.




***Note:***
*The information in this field is freely programmable. The method of defining is described in the point 15.3 of the manual.*

- The on-screen functional keys are below:

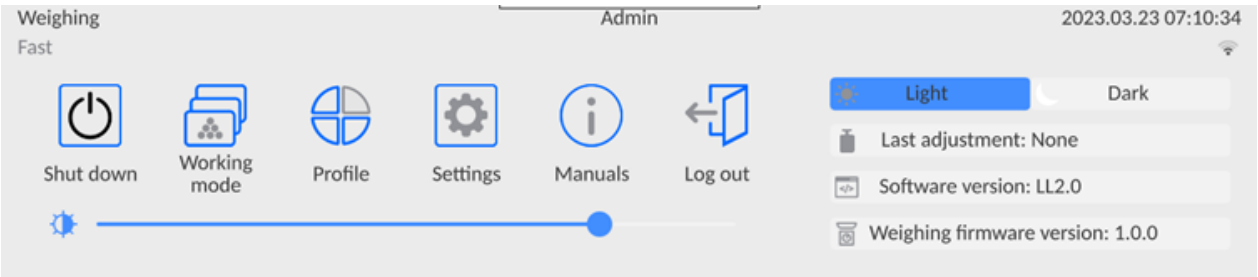
***Note:***
*The operator can define on-screen functional keys. The method of defining them is described in the point 15.2 of the manual.*

- Fixed functional keys can be found at the bottom of the screen:

## 10. LOGIN

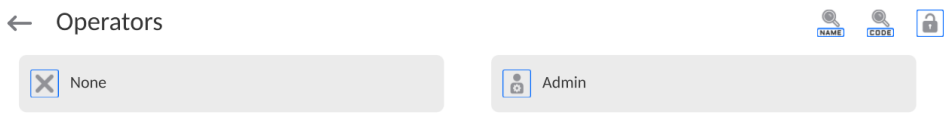
To gain full access to operator's parameters and be able to edit databases, you must activate the product and log in as an **<Administrator>**.

To do so, expand the menu in the top part of the screen.




**First login:**

- After expanding the top menu, press **<Log in>.** The operator base window will open. You will see **<Admin>**.




- By default this operator is not assigned the access password. After choosing it, the operator will automatically enter the software home screen.

***NOTE: After the first login, enter operators and assign them relevant permission levels and unique access passwords (procedures described further in the manual, see point 13 and 20.2).***
***During another login, select the operator from the list and enter the password to make the software activate operation with permission for the specific operator.***

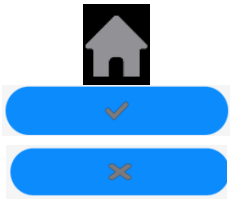
**Logout:**

- Expand the menu in the top part of the screen and press .
- After collapsing the top menu in the upper bar, the name of the logged operator will turn into **<Unlogged>**.

# 11. NAVIGATION IN THE WEIGHING MENU

Navigation in the menu of the weighing program is intuitive and user-friendly. Thanks to a display with a touch panel, it is very easy to operate the program. Press the on-screen key or field in the display to activate the relevant operation or function.

## 11.1. Keypad



Press to enter the main menu.

Press to confirm modification.

Press to return to the previous view without changing the parameter value.

Press to add a database record.

Press to search for a particular database entry by date.

Press to search for a particular database entry by name.

Press to search for a particular database entry by code.

Press to print database entries.

Press to select printout template variables from the list.

Press to go back.

## 11.2. Voice commands

The weighing program allows performing several operations via voice commands. These are the following operations: tarring, zeroing, measurement printout/saving. The commands must be expressed in English, in a suitable sequence. See below for the structure of particular commands.

Tarring: **ellipsis [please] (tare | tar | terre) [the] device**

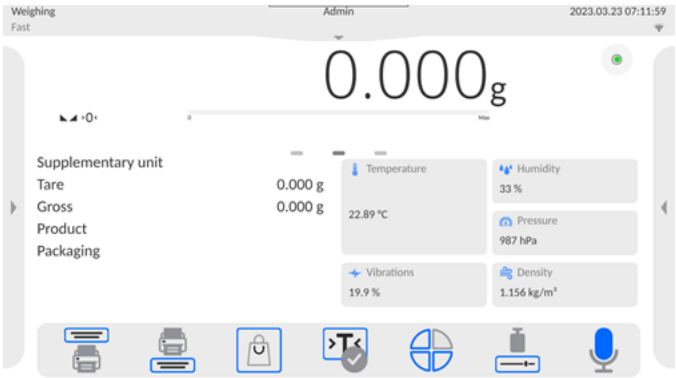
Zeroing: **ellipsis [please] zero [the] device**

Printout/Saving: **ellipsis [please] save [the] (mass | measurement | mass measurement)**

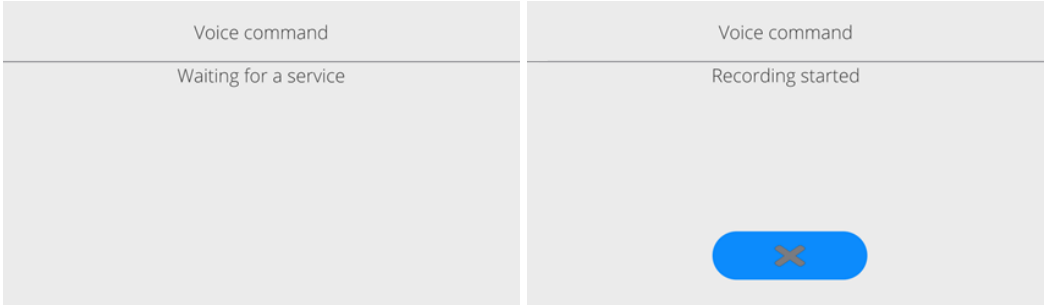
The method of expressing the command: black text is obligatory, green can be expressed or not, red – one of them must be expressed
*e.g. for Print:* ***ellipsis save mass.***

Procedure:

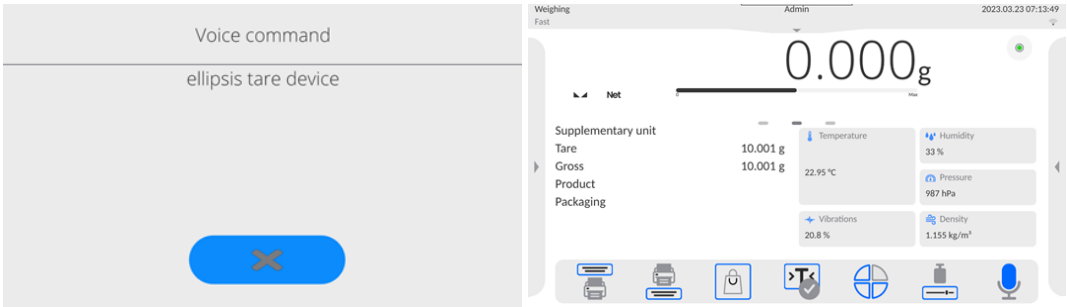
1. Put voice command activation key on the key bar (method of adding keys is described further in the manual).




2. Press key.
3. The voice command detection procedure will be initiated. The operator will be informed about it through messages displayed.




4. Express the command as per the description above.
5. If the command has been expressed correctly and the program can detect it, the message will be displayed and the command will be automatically executed.



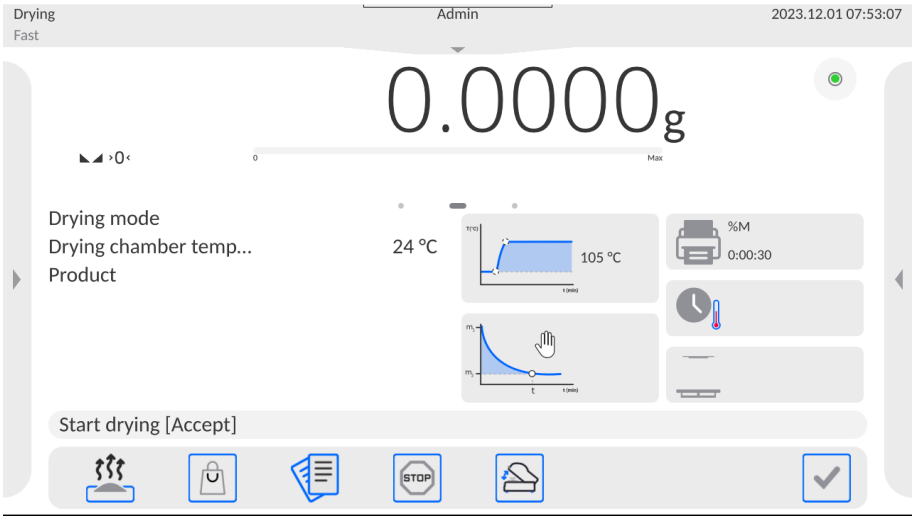

## 11.3. Return to weighing

Any modifications entered into the weighing memory are automatically saved in the menu after returning to the home screen.

**Procedure:**

- Press key a couple of times to display the home screen.
- Press field in the top bar to return to the home screen instantly.

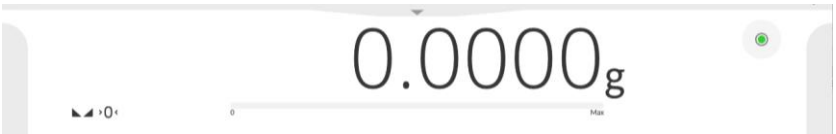
## 11.4. Drying mode window



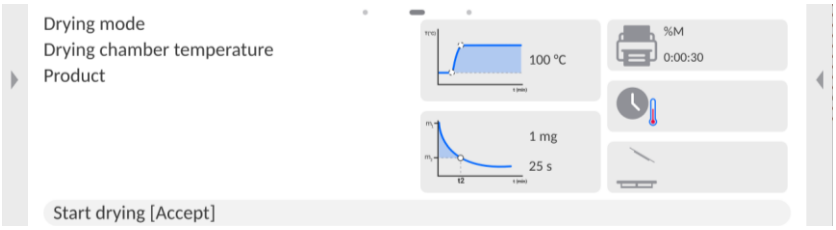

**The home screen of the application can be divided into 4 fields:**

- The top part of the screen shows information on a currently used working mode, logged operator, date, time, active connection to PC and device levelling.

- Below is a window with a weighing or drying result:




- A grey field contains additional information related to ongoing operations as well as drying parameter settings and current condition of the device




***Note:*** *The information in this field is freely programmable.*
*The method of defining is described in the point 15.3 of the manual.*

- Below are on-screen functional keys:

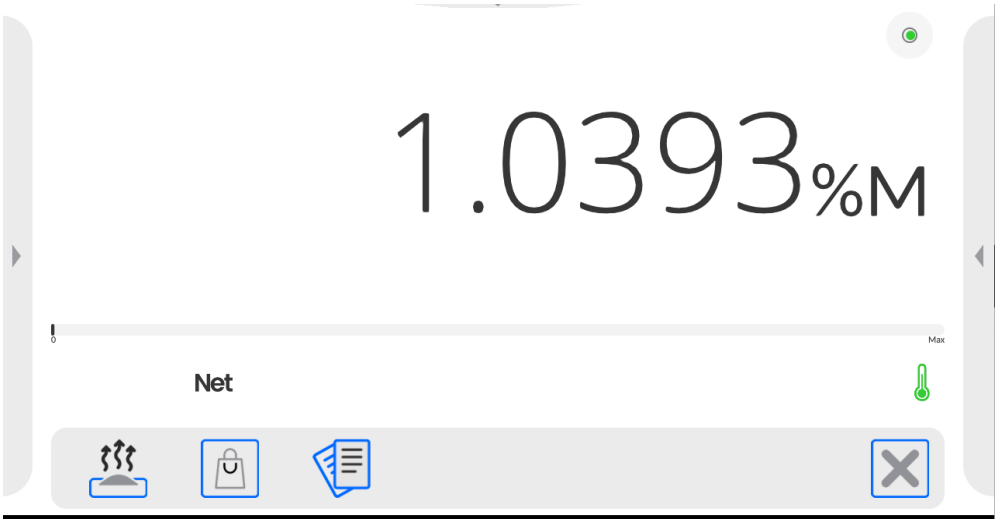
***Note:*** *The device operator can define on-screen functional keys. The method of defining is described in the point 15.2 of the manual.*

- Fixed functional keys can be found at the bottom of the screen:

### 11.5. Drying result

The drying result is showed in the home screen. The operator can zoom the result in so that it is visible from a larger distance.

**Procedure:**
To enlarge the readout, press the field with the result.




To return to the standard display, click the white field of the result again. You will return to the previous view.

## 12. CALIBRATION (ADJUSTMENT)

Moisture analysers are subject to calibration (adjustment). Thanks to this, a suitable measuring accuracy is guaranteed. The access to functions responsible for controlling the calibration can be obtained in the <CALIBRATION> menu. This menu contains the following elements:

### 12.1. Internal calibration

The internal calibration adopts the mass built inside the device.

Internal calibration> key triggers automatic initiation of the calibration. When it is finished, the screen shows the message on the end of the procedure and its status.

***Note:*** *The device calibration requires stable conditions (no air blows, no floor vibrations). The calibration procedure must be performed when the weighing pan is empty.*

### 12.2. External calibration

The external calibration is performed with the use of external templates of a suitable accuracy and mass that depends on the type and loading capacity. The procedure is semi-automatic while further stages signalled through messages in the screen.

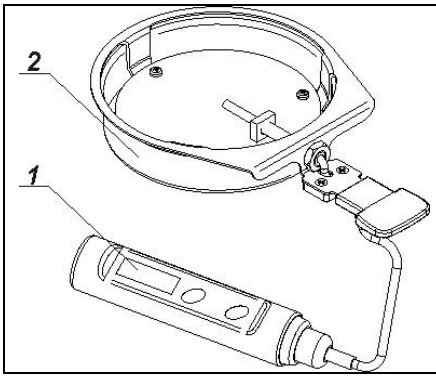
**Procedure:**

- Enter <Calibration> submenu and press <External calibration> field.

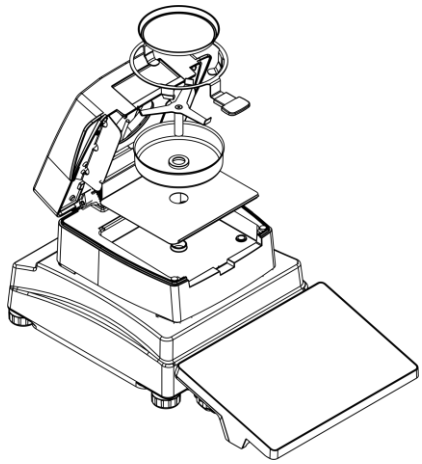
- The message in the screen will tell you to remove the load from the weighing pan and press key. While determining the start mass, the following message will be displayed: **Mass is being determined….**
- Once the start mass determination procedure has ended, the display will show another message. Based on the message, you need to put the desired weight on the weighing pan and press key.
- For some types of the device, the display will show another message. Based on the message, you need to put another weight on the weighing pan and press key.
- Once the procedure has ended, remove the weight from the weighing pan and press key to confirm and return to weighing.

### 12.3. Temperature calibration (adjustment)

The calibrate (adjust) the temperature, a special set that comes as an extra can be used.

| | |
|---|---|
|  | 1. Thermometer<br>2. Thermometer holder with dedicated cover |

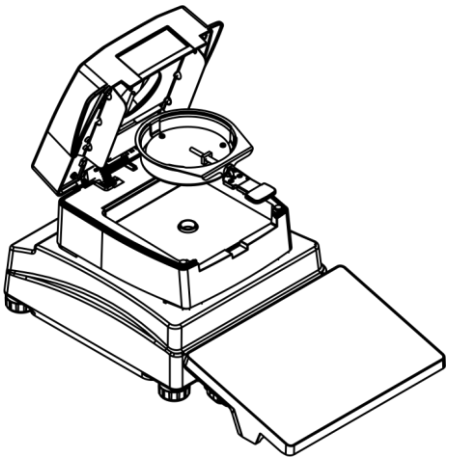
The calibration aims to adjust the temperature sensor of the moisture analyser drying chamber. To start the aforesaid calibration, you need to assemble the temperature adjustment set as per the diagram below.



Step 1.

Remove the following items from the drying chamber:

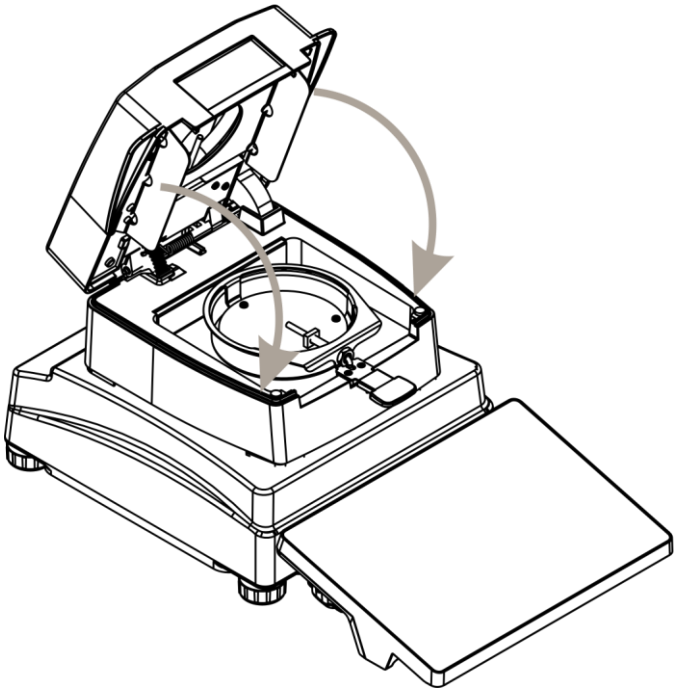
- disposable weighing pan,
- weighing pan holder,
- cross,
- weighing pan cover.



Step 2.

Put the pieces of the set inside the drying chamber:

- set cover,
- thermometer holder with thermometer.

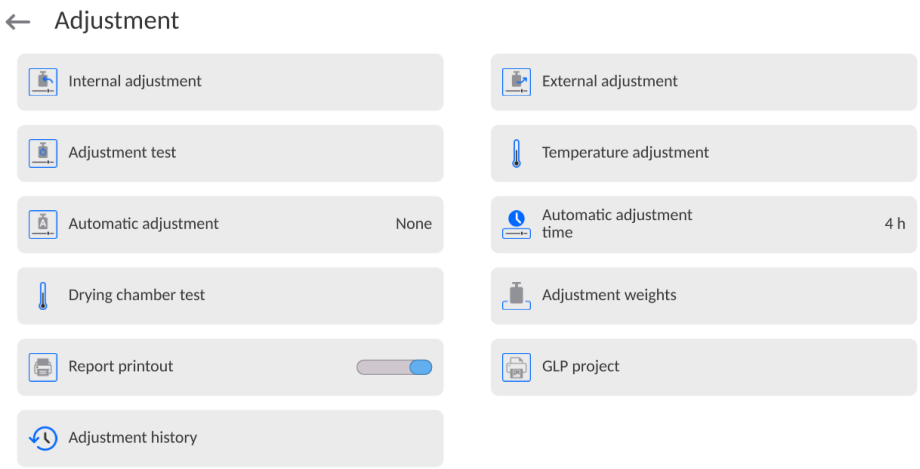


Step 3.

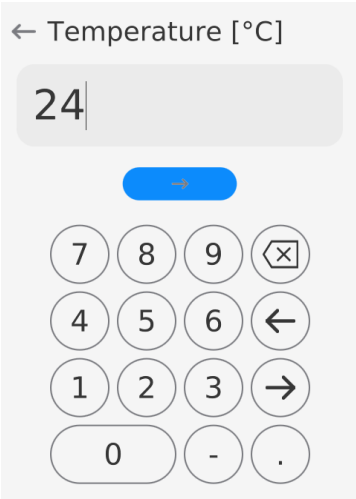
After installing the set, close the drying chamber and initiate the temperature calibration.

***Note:***
***All steps must be taken carefully in order not to damage the moisture analyser mechanism.***

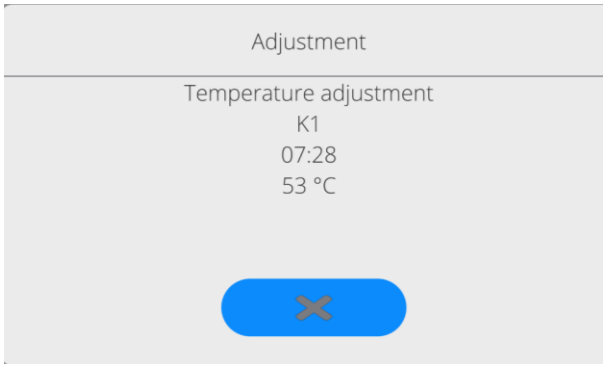
Enter <Calibration> menu group.
Activate the procedure by pressing <Temperature calibration> name.



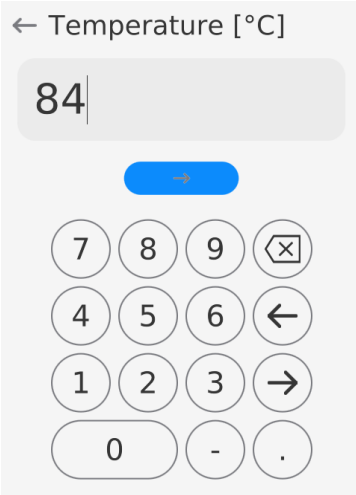
The moisture analyser will display a message on initiation of the procedure and information on the process (step number, temperature, heating time).




After 8 minutes, the display will show a numerical keypad box. Enter the value that corresponds to the current temperature of the moisture analyser. Read the value from the external thermometer. Use <CONFIRM> key to proceed with further calibration.

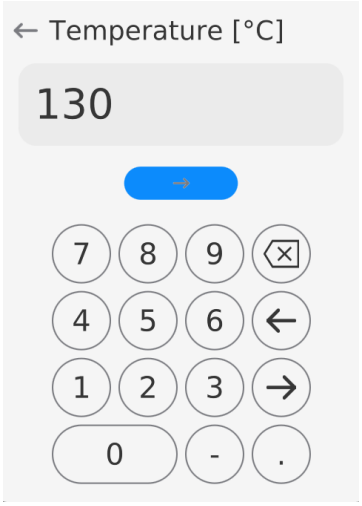



The moisture analyser will activate the halogen and will keep on heating the drying chamber for 8 minutes, simultaneously displaying the current temperature and other information.




After this period of time, the display will show the numerical keypad box. Enter the value that corresponds to the current temperature of the moisture analyser. Read the value from the external thermometer. Press <CONFIRM> key to proceed with further calibration.

The moisture analyser will start the last step of the procedure by heating the chamber to reach a higher temperature, and will keep this temperature of the chamber for 8 minutes, displaying its current condition.



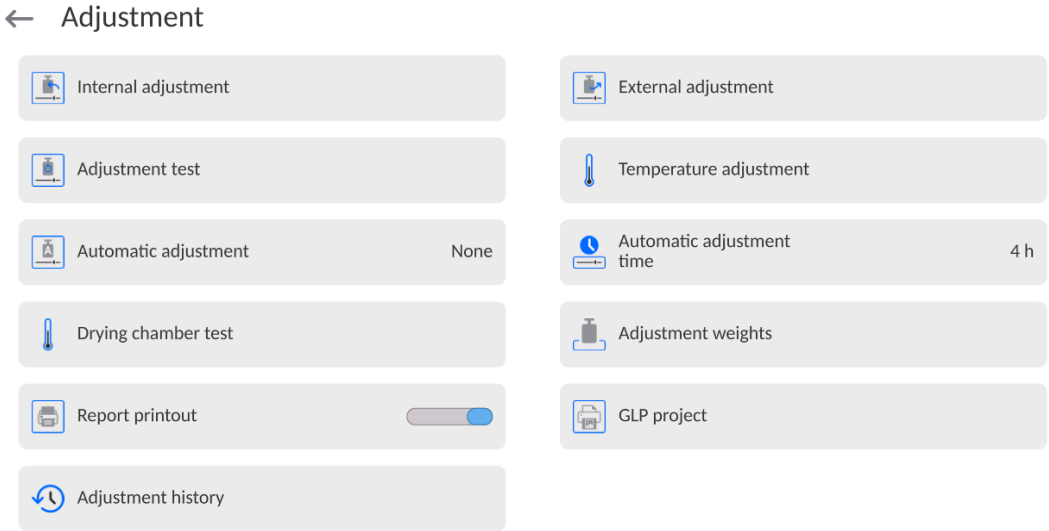

After this time, the display will show the numerical keypad box. Enter the value that corresponds to current temperature of the moisture analyser. Read the value from the external thermometer. Press <CONFIRM> key to finish the procedure.

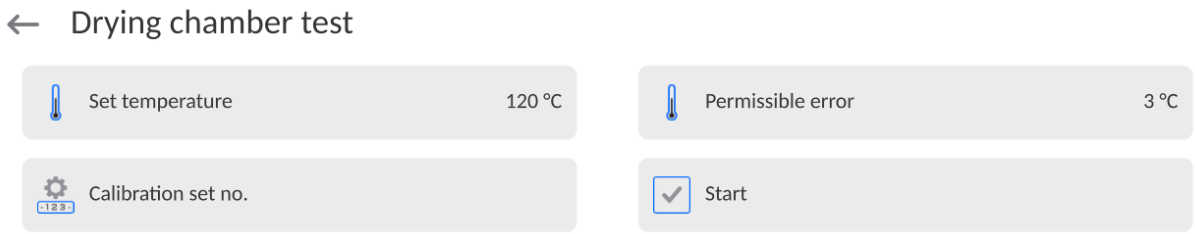
Once the procedure has ended, you will see a message on completion. Approve the procedure by pressing <CONFIRM> key, and return to the home screen.

### 12.4. Drying chamber test

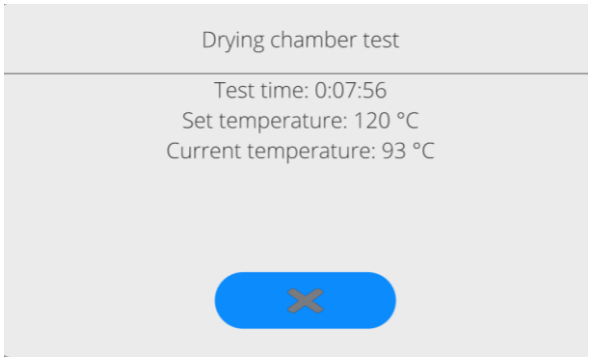
<Drying chamber test> parameter allows you to make sure the moisture analyser thermometer's readout is correct.
The drying chamber testing procedure requires a special set that the moisture analyser is additionally supplied with. The method of installing the set has been described in the preceding point of the manual (*Temperature calibration*).

To start the procedure, install the set in the drying chamber and then enter <Calibration> menu group and initiate the procedure by pressing <Drying chamber test>.

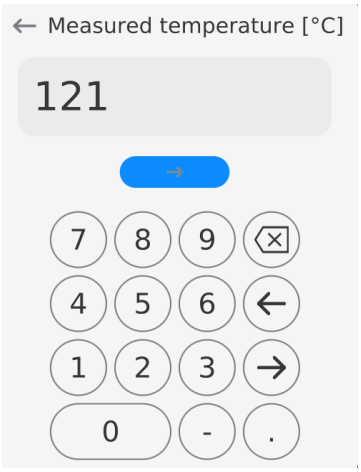




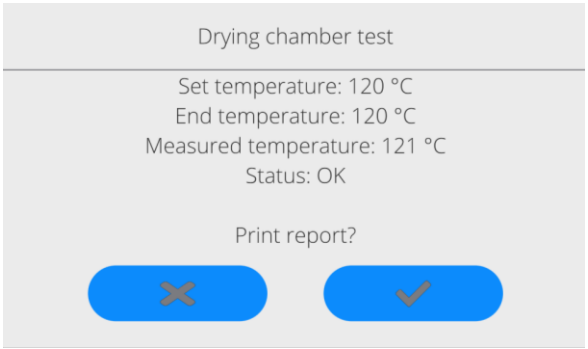

You will see a window in which you can enter the temperature which the moisture analyser is to be checked at and in which you can enter the permissible error for temperature (must not be lower than the factory value). Next, enter the control set factory number. After taking these steps, press <Start> field. The drying chamber heating procedure will start. The control time for the specific temperature is 8 minutes.
While heating, the window with ongoing data for temperature and heating time are displayed.




Once the test is finished (testing time expires), a numerical keypad box will be displayed. Use the keypad to enter the temperature taken from the thermometer.




After entering and confirming the temperature, a test summary box will be displayed.



In the window, you can print the test report out. After selecting one of the options, the program will return to <Calibration> menu box automatically.

*The example of the report:*

*--------- Drying chamber test ---------*

| | |
|---|---|
| *Operator* | *Admin* |
| *Start time* | *2023.11.08 10:48:01* |
| *Device type* | *MA 5Y* |
| *Device ID* | *121715* |
| *Calibration set no.* | |
| *Set temperature* | *120 °C* |
| *Final temperature* | *119 °C* |
| *Measured temperature* | *121 °C* |
| *Permissible error* | *+/- 3 °C* |
| *Status* | *OK* |

*----------*

*.....*

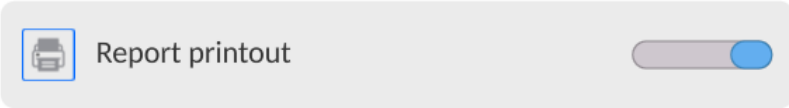
*(Signature)*

The report is not remembered by the program. When you leave the summary box, the report is deleted from the volatile memory of the moisture analyser.

If the operator aborts the procedure, the summary box will not be displayed and the program will return to <Calibration> menu.

### 12.5. Report printout

<Report printout> parameter informs the operator about whether the calibration report is to be printed out automatically after the end of the calibration.
To enable the automatic report printout, set the active printout.




### 12.6. GLP project

GLP is one of the ways of documenting the operation in accordance with the adopted quality system. The information selected for printout will be printed out on each mass calibration report.

The operator can use the following information and marks:

| | |
|---|---|
| calibration (type of calibration) | working mode (working mode name) |
| date | time |
| device type | device ID |
| operator | full name |
| levelling | nominal mass |
| current mass | difference |
| temperature | dashes |
| empty line | signature |
| non-standard printout | |

## 12.7. Calibration history

It contains the latest 50 calibrations. The data are saved automatically. Every saved calibration contains basic data on the procedure. In this menu, you can display a list of saved calibrations. Every report can be printed out.
To print the calibration report out, enter <Calibration> submenu and go to <Calibration history> to select the calibration that is to be printed out. When details are displayed, press printer icon in the top bar.

***Note:*** *If you save 50 subsequent calibrations, the 51st item will replace the oldest record in the list and the oldest record will be deleted.*

If internal procedures require complete documentation for all calibrations, the list with records must be printed out and archived on a periodical basis.

### Searching for calibrations

It is possible to find information on completed calibrations. To do so, press

key and enter the completion date.

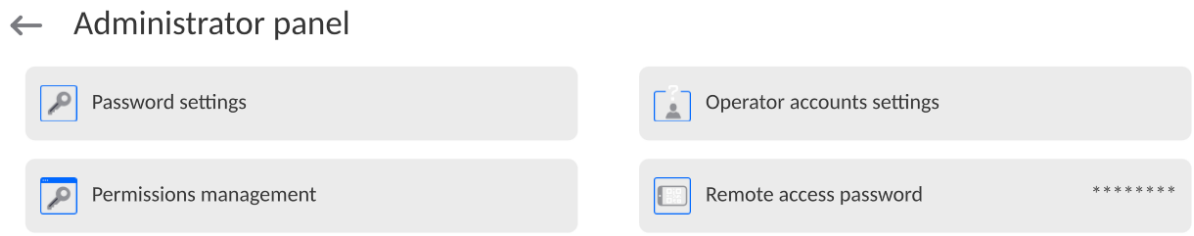
### Exporting information on calibrations

To export information on completed calibrations, insert the USB memory stick into the device port. Then press key at the top right corner of the screen. The procedure is automatic. Once the procedure is finished, a file with **.tdb** extension is saved. You can edit the file for example in the Excel or other text editor.

# 13. ADMINISTRATOR'S PANEL

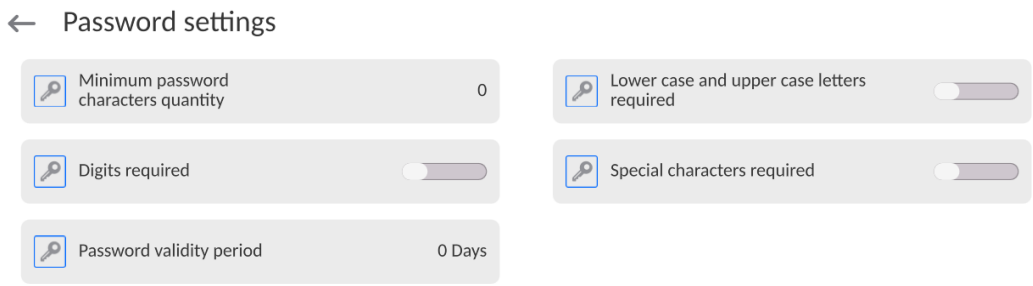
This menu group defines the scope of activities that a specific operator can take, the password protection degree and permission level for the unlogged operator.

***NOTE: Only the operator with <Administrator> level can modify this menu.***



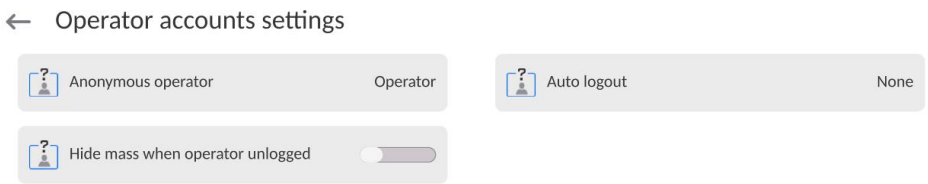

## 13.1. Password settings

This menu group allows specifying the complexity of the password for device operators.

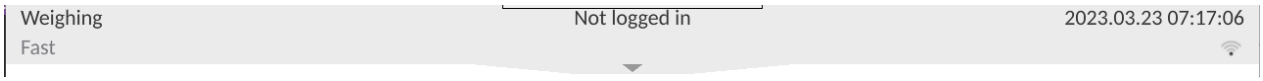



| | |
|---|---|
| Minimum password length | Specify the minimum number of characters in the password.<br>For „0", you can set any number of characters. |
| Require lower- and upper-case letters | Specify requirements related to the content of characters in passwords. |
| Require digits | |
| Require special characters | |
| Password validity period | Specify the period of time, in days, after which you need to change the password.<br>For „0", the program does not require the change of the password. |

## 13.2. Operator's account settings



**Unlogged operator's permission levels**
The administrator can assign the permission level to the device operator who has not logged in (the so-called anonymous user).




**Procedure:**
Enter <Operator account settings> parameters group, select <Unlogged operator permission levels> variant and then select one of the options: Guest, Operator, Advanced Operator, Administrator.

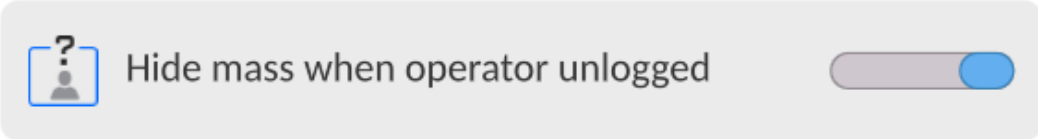
***Note:*** *In case of choosing* ***<Guest>,*** *the unlogged operator is not granted any permission to change settings.*

**Automatic logout**
This option allows you to enable automatic logout after a specific period of time, given in minutes, if the device remains inactive.
By default this option is disabled (setting: <None>).

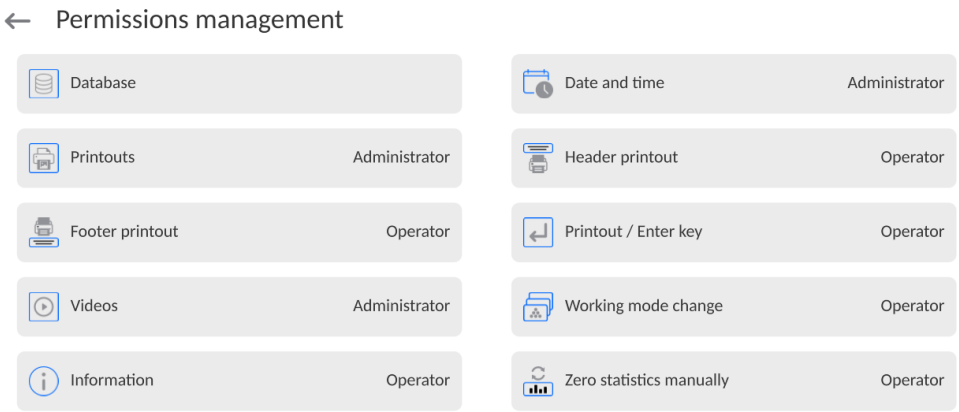
**Procedure:**
Enter <Operator account settings> parameters group, select <Automatic logout> and then select one of the options: none/3/5/15/30/60. Time is given in [min].

**Hide mass when operator is unlogged**
This option allows you to disable mass display if the operator has not logged in. By default this option is disabled.

**Procedure:**
Enter <Hide mass when operator unlogged> and then switch the value into active.

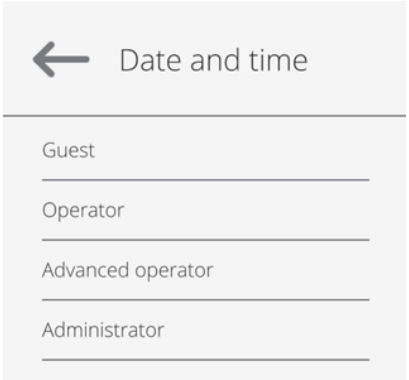



## 13.3. Permission management

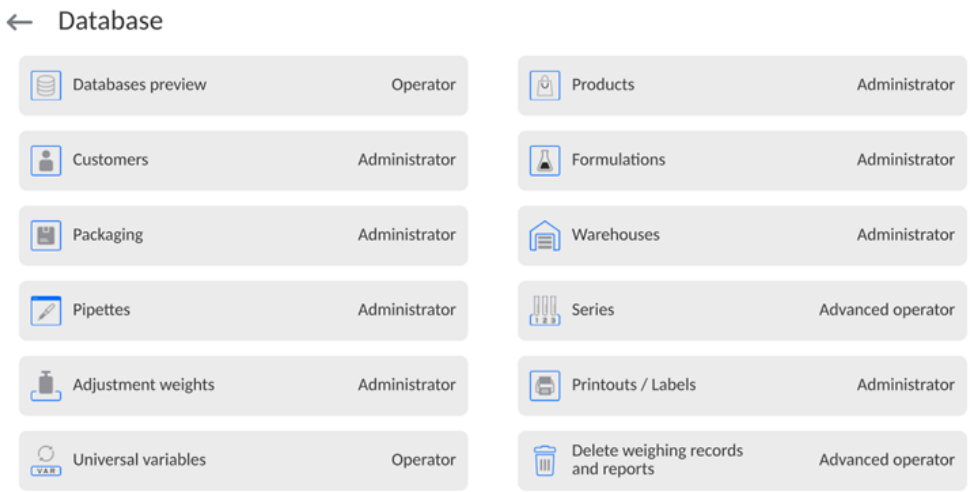



***Note:*** *In case of switching permission into* ***<Guest>*** *for particular parameters, the access to settings will be open (no need to log in).*

For each option, you can assign the permission level for edition.
The following settings are available:



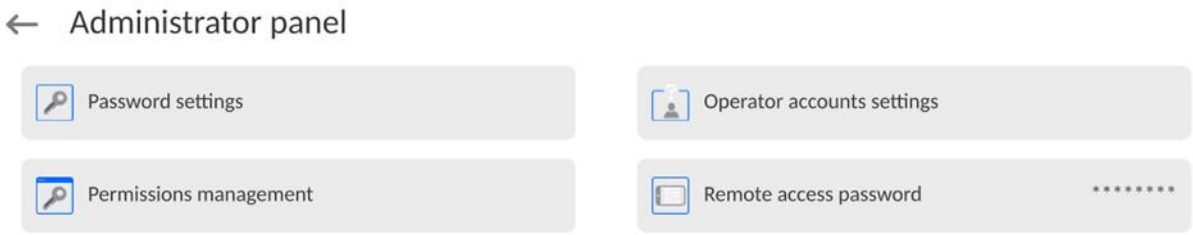

**Databases**




Default settings of the device allow the operator logged as an **Administrator** to make changes within particular databases. Depending on requirements, these permission levels can be modified.

Similarly you can change permission for edition of other options available in this menu.

## 13.4. Remote access password




The device allows a remote access by using the connection to the local Internet network that a computer is connected to. In this respect **VNC Viewer** application can be used.
A default password set in the program is the sequence of characters: ***radwag1234***. If you do not wish to use the default password, you must set your own unique password in this parameter.

*Note: please remember a new password in order not to lose the remote access to the moisture analyser.*

# 14. PROFILES

The profile is a set of information that describes:

- how the function is supposed to work; e.g. parts counting, percent weighing % etc.,
- what information will be displayed during operation,
- what keys will be active,
- which units will be available,
- what criteria apply to the speed of operation and result stabilisation.

The program allows creating numerous profiles, which means that:

- every operator can create his own unique working environment,
- it is possible to design the mode of operation of the device by making the keys and required information (work ergonomics) available.

For the sake of easy use of the device, there are 4 default profiles. They have been assigned settings to make sure weighing is optimal for specific needs and conditions.

These are the following profiles:

- **Fast** – the profile allows quick weighing of any weights, regardless of the working mode. Upon the first activation, the device enters this profile automatically. This profile has been assigned parameters to make sure the final measurement result is obtained as fast as possible,
- **Fast dosing** – the profile is intended for dosing and allows quick mass dosing. If selected, this profile causes the operator to enter the DOSING mode automatically,
- **Precision** – the profile is intended for precise weighing of any weights, regardless of the working mode. The weighing procedure in this profile is the longest but the final result is the most precise and accurate,
- **User** – the basic profile that has been assigned filter settings which cause the weighing procedure to be fast and precise. If selected, this profile causes the operator to enter the WEIGHING mode automatically.

***Note**: the operator can fully modify the profile settings; only for the User profile, other default profiles (Fast, Fast Dosing and Precision) can be modified to a limited extent. Every additional profile created by the operator can also be fully modified.*

## 14.1. Profile creation

The device administrator can create new profiles by:

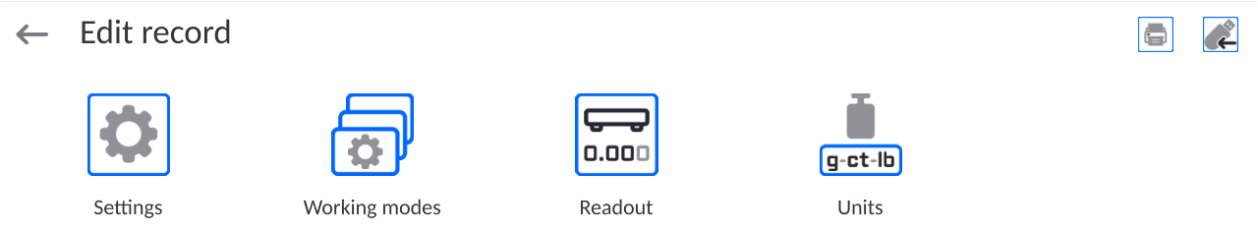
- copying the existing profile and modifying it afterwards,
- creating a new profile.

**How to copy the existing profile**
**Procedure:**

- Enter the main menu by pressing key.
- Next enter submenu.
- Press and hold the profile name that you wish to copy.
- A menu will be displayed. Select <Copy> there.
- A profile named <Copy name> will be created. All settings will be identical to the base profile settings.
- When copied, change the data that must be modified (name, etc.)

**How to add a new profile**
**Procedure:**

- Enter the main menu by pressing key.
- Next enter submenu.
- Press key.
- A new profile will be automatically added and ready for edition in the program.




**How to delete the profile**
**Procedure:**

- Enter the main menu by pressing key.
- Next enter submenu.
- Press and hold the profile name that you wish to delete.
- A menu will be displayed. Select <Delete> there.
- Next you will see the following message: <Are you sure you want to delete?>.
- Press key to confirm the message and the profile will be deleted.

***Note:*** *It is possible to perform operations in profiles only after logging in as the Administrator.*

## 14.2. Profile structure

Each profile contains the following items:

**Settings** The menu allows assigning a unique profile name (a sequence of alphanumerical characters) and declaring the default mode (the specific mode will always be instantly enabled after selecting the profile).

**Working modes** This option allows you to set distinctive options for particular working modes. They contain such submenus as:
- Mode-related additional settings
- Keys
- Information
- Printouts

**Readout** It contains the following:
- Filter
- Result approval
- Autozero
- Autozero: Dosing
- Last digit
- Number of last digits
- Environment

**Units** The menu allows declaring the start unit, additional unit, 2 defined units

as well as entering the gravitational acceleration value in the place of using the device and declaring availability of particular units.

### 14.2.1. Settings

**Name**
After entering this option, the keypad box will be displayed. Enter the profile name and press key to confirm. The name will apply to the profile.

**Default working mode**
After entering this option, you can select a specific working mode as a start-up mode. In case of <None> variant, when the profile is selected, the device remains in the last used mode.

### 14.2.2. Working modes

After entering this option, the window with all available working modes will show up. The operator can adjust each of them in terms of settings that will be called after selecting a specific profile.

The following parameters are available in each of the working modes:

- Settings:
  specific settings related to the working mode and such universal settings as result control, tare mode, automatic footer printout, printout mode, printout.
- Quick-access key functions:
  declaration of keys that will be visible in the lower part of the screen.
- Information:
  selection of information to be displayed in the grey info field.
- Printouts:
  selection of a type of printout or defining a non-standard printout.

### 14.2.3. Readout

The operator can adapt the device to external environmental conditions (filter degree) or own needs. <Readout> menu consists of the following items:

**FILTER (unavailable to the following profiles: Fast, Fast dosing, Precision)**
Before it is displayed, every signal is electronically processed to obtain correct parameters typical of the stable signal, that is ready for readout.
By choosing a suitable FILTER, the operator can influence the scope of processing to a certain extent.
Options to choose from:

- very fast, fast, medium, slow, very slow.

Choosing the filtering level, real working conditions of the device must be considered.
For very good conditions, you can set a medium or fast filter, while for unfavourable – slow or very slow filter.

***Note:***

- *for precise balances, it is advisable to choose very fast ÷ medium filters,*
- *for analytical balances and microscales, it is advisable to choose medium ÷ very slow filters.*

**Result approval (unavailable to the following profiles: Fast, Fast dosing, Precision)**
It determines the time when a stability sign is displayed for the measurement result.

You can set one of three result approval variants:

- fast, fast + precise, precise.

***Note:*** *How fast the stable result is achieved depends on the type of filter and specific result approval.*

**Autozero function**
The task of this function is to automatically control and correct the zero value of the product. When the function is active, further results are compared at fixed time intervals. If these results differ by less than the declared range of AUTOZERO, e.g. 1 reading unit, the device will automatically zero and stable result markers will be displayed (◣◢) together with zero value (→0←). When the AUTOZERO function is active, every measurement starts from the precise zero. There are special cases in which this function hinders measuring. For example when you very slowly place the load on the weighing pan (e.g. pour the load on); this being the case, the zero correction system may also correct real load mass values.
Available values: **NO** - autozero function inactive.
**YES** - autozero function active.

**Autozero function: Dosing (unavailable to the following profiles: Fast, Fast dosing, Precision)**
The task of this function is to set the autozero operation in a dosing function by default.
Available values:
**NO** - autozero is disabled automatically after entering the Dosing mode.
**YES** - autozero is enabled automatically after entering the Dosing mode.

**Last digit**
Using this function, you can disable visiblity of the last decimal place in the weighing result. This function offers three setting variants:

- **Always:** all digits are visible.
- **Never:** last result digit is disabled and is not showed.
- **When stable:** Last digit is displayed only when the result is stable.

**Number of last digits**
Using this function, you can declare the number of hidden last digits of the result. The function offers three setting variants and works in connection with <Last digit> option:

- 1: last digit of the result.
- 2: two last digits of the result.
- 3: three last digits of the result.

**Environment**
This parameter refers to the surrounding and conditions which the moisture analyser is working in. If the environmental conditions are unstable, it is advisable to change the parameter into Unstable. The factory setting for this parameter is: Stable.
Setting the Stable value causes the device to work faster. It means that the weighing time is much shorter when compared to Unstable parameter.

- **Unstable; Stable.**

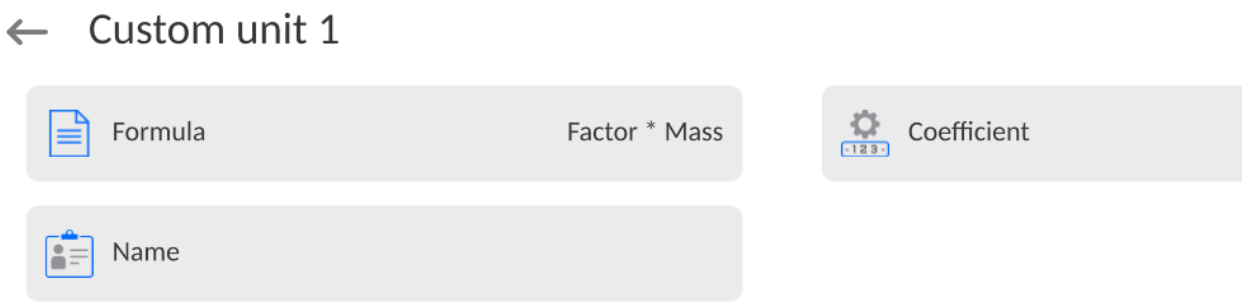
### 14.2.4. Units

The operator can declare a start unit and additional unit as well as two defined units for the specific profile.

Here it is also possible to enter the gravitational acceleration value in the place of using the device. It is required for using the mass indication in [N].

**The defined unit has the following:**

- Pattern (way of calculating the defined unit): Coefficient * Mass or Coefficient/Mass.
- Coefficient (declaration of the coefficient for calculation of the defined unit as per the specific pattern)
- Name (unique name of the unit that is to be displayed next to the result – max. 3 characters)




If such a unit is designed, its name will be showed in the list of available units. This option is available only to non-verified balances.

## 15. WORKING MODES – general information

In their standard design, MA 5Y moisture analysers offer the following working modes:

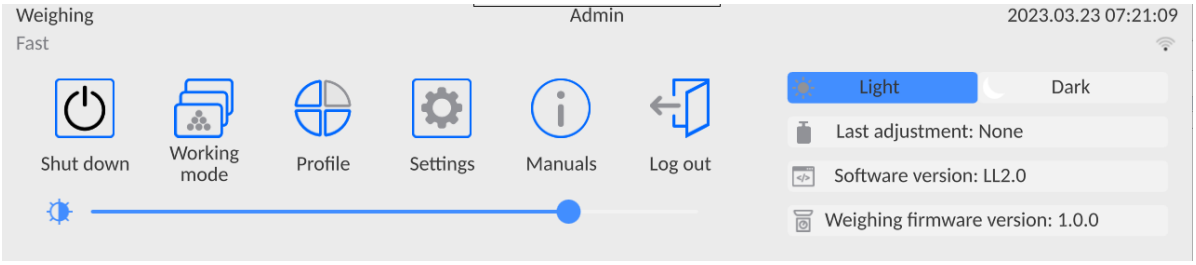
**Weighing**
Principle of operation: the weight of the load is specified through indirect measurement, the gravitational force applicable to the load is measured. The result is processed into a digital form and displayed in the screen.

**Drying**
Principle of operation: the sample humidity is specified by evaporating all elements of the moisture from the sample placed inside the drying chamber. The result is automatically calculated and displayed in real time by the moisture analyser program on the basis of the sample mass at the beginning, during and at the end of the procedure.

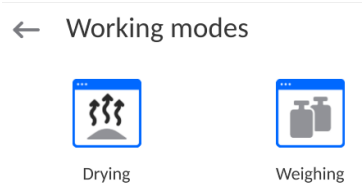
Special functions are available in the <DRYING> mode settings. Thanks to them, you can adapt the mode to individual needs. These settings are called by selecting a suitable profile. A detailed description of the mode can be found further in the manual.

To change the working mode, do as follows:

- Expand the menu at the top of the screen.




- Press <Working mode> variant.
- You will see a list of modes in the screen.

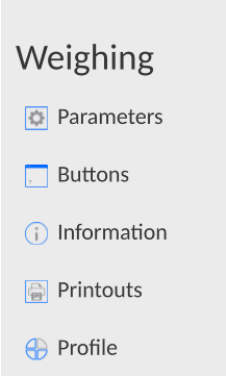



- Select the name of the mode that is to be used and the device will run the mode automatically.

## 15.1. Parameters related to working mode

Every working mode is assigned programmable parameters that determine its operation. The access to these parameters is obtained in the following way:

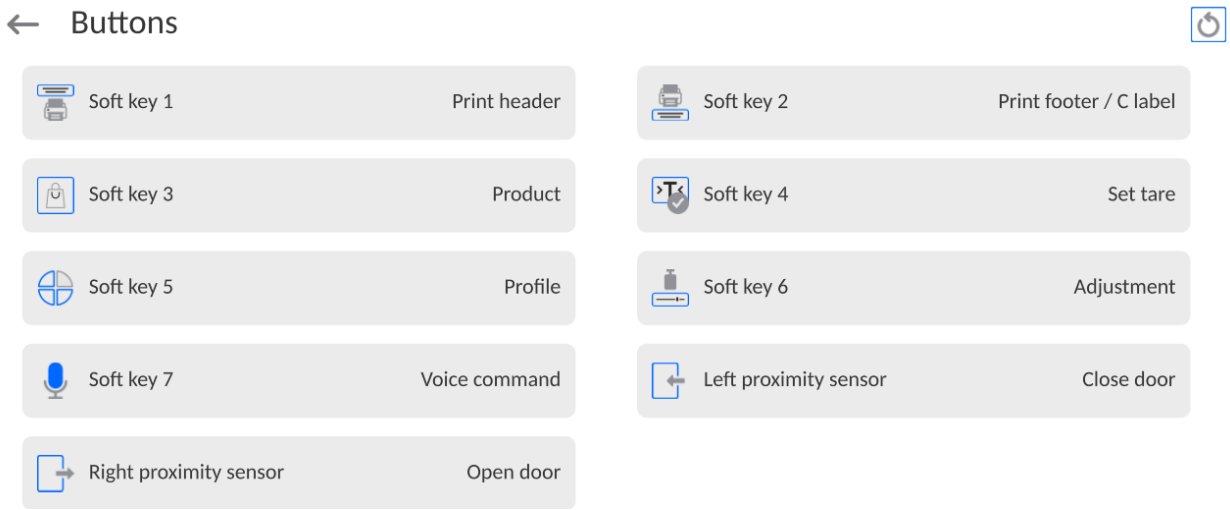
1. Expand the side left menu.




2. You will see a menu in the screen:
   - <Parameters> - additional options related to the mode.
   - <Keys> - you can define quick-access keys.
   - <Information> - you can select information that is to be showed in the Info field.
   - <Printouts> - select the type and content of printout.
   - <Profile> - profile settings
3. Press a relevant menu and select the element that is to be modified.

The description of basic parameters included in the <Settings> menu is showed in the point 16.6 *Additional weighing parameters.* Other parameters related to specific modes are described in the presentation of these modes.

## 15.2. Quick-access keys, proximity sensors

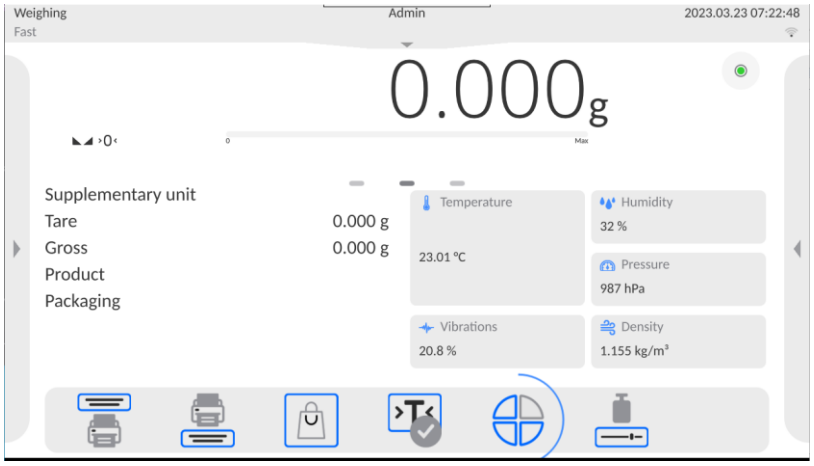



You can quickly return to the default arrangement of keys in the lower bar of the screen. To do so, press key in the top right corner of the screen.

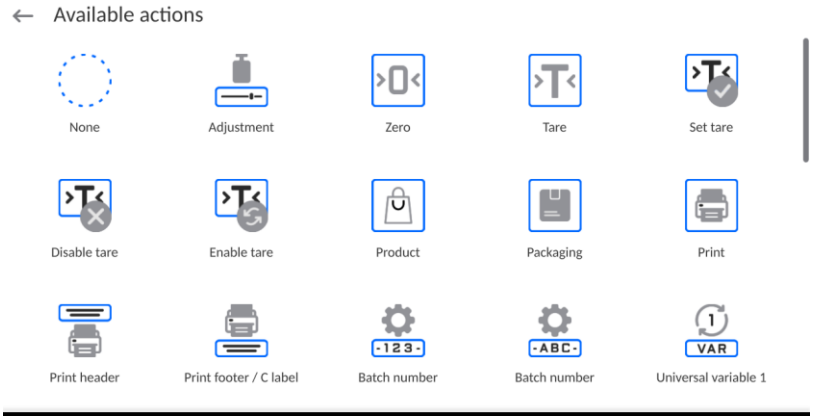
You can define 7 keys that can be visible in the lower bar of the screen. After assigning the function to the key, you will see a relevant icon showed in the lower navigation bar of the home screen. Availability of keys depends on the working mode. The list

of keys can be found in the ATTACHMENT B to the manual. It is the so-called quick-access key for the most frequent operations.
For each working mode, a default arrangement of keys is programmed. You can quickly restore the default arrangement of keys when you select <Default arrangement of keys> function.

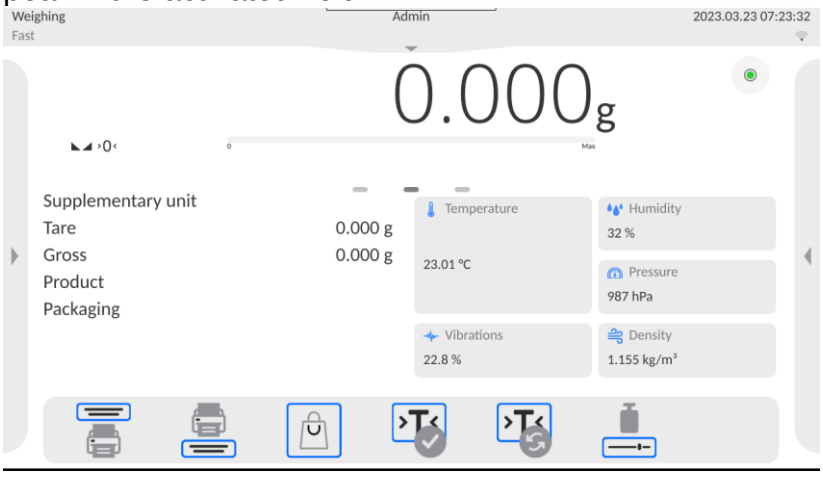
Another way of adding or changing the key is to press and hold the field in the key bar for about 3 seconds.




The program will automatically display the box with available keys.




Press the key that is to be added and the program will return to the home screen and the specific key will appear in the activated field.



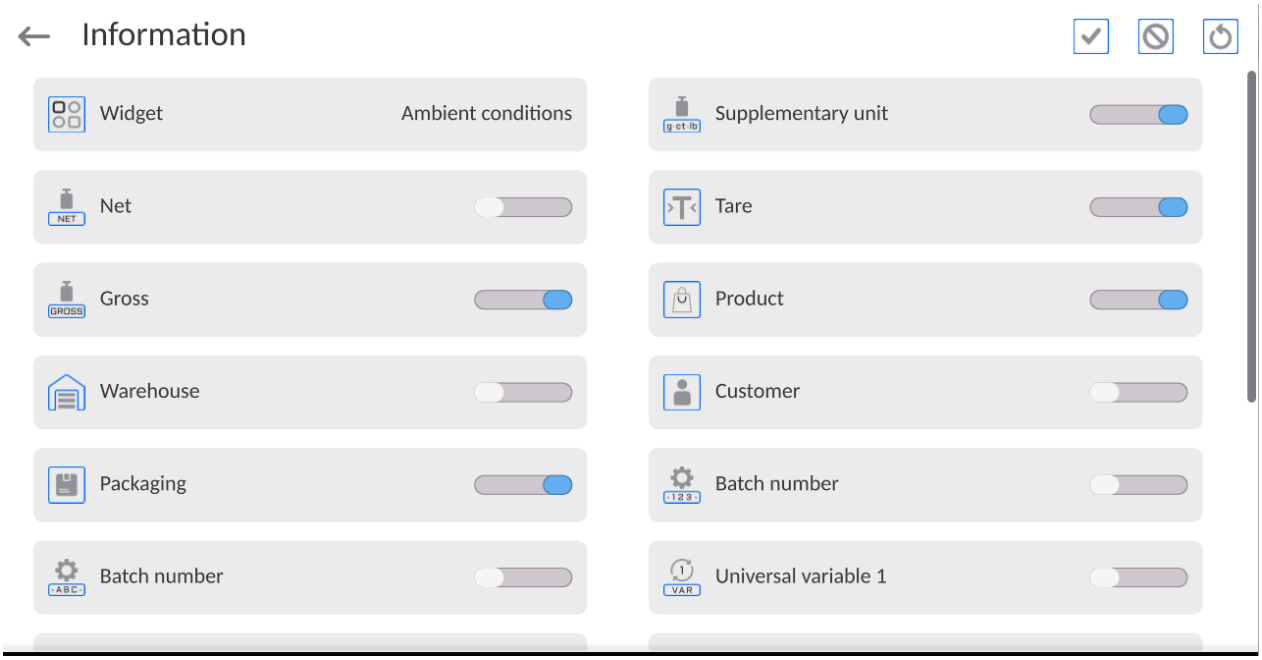

***Note:*** You can gain an access and browse the manual saved in the memory. To use this function, set ? key in the keys bar.

### 15.2.1. Proximity sensors

The moisture analyser is equipped with two proximity sensors that allow controlling the operation of the device with no need to press keys on the housing or touch screen.
The program can recognise four motions near sensors:

1. Hand approaching the left sensor <**Left proximity sensor**>.
2. Hand approaching the right sensor <**Right proximity sensor**>.

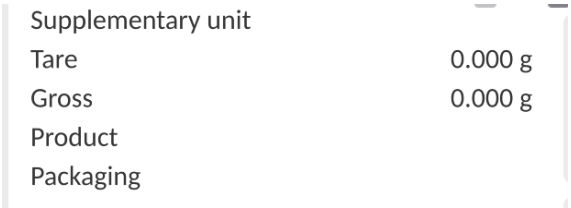
## 15.3. Information




You can quickly change selection of information to be displayed by using keys in the top right corner of the screen.

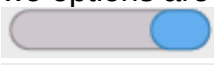
| | |
|---|---|
| | Unselect all information. |
| | Select all information. |
| | Restore default selection of information. |

The weighing-related information is showed on the left side of the central part of the screen.




You can put 6 pieces of information at the most there. If more, the first 6 will be displayed.

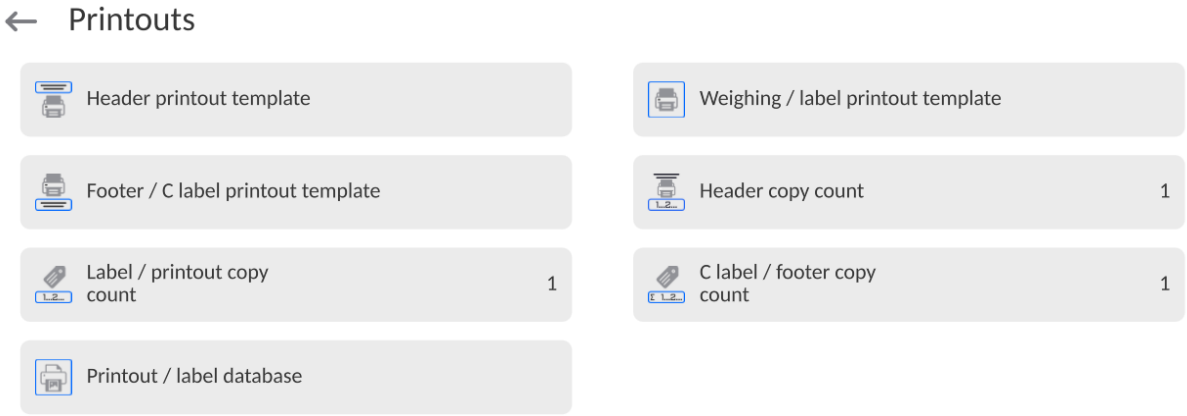
Two options are available for each piece of information:

-  – data enabled.
- – data disabled.

## 15.4. Printouts

The <Printouts> menu contains settings related to configuration of printouts for each working mode separately.

The <Printouts> menu is composed of three setting sections. The first section is standard printouts: <Header printout template>, <Weighing/label printout template>, <Footer/C label printout template>. The second section is non-standard printouts: <Printout/label base>. And the third section is parameters allowing you to set the printed quantities: header, weighing and footer. Press (once) the call key for particular printouts to do so.




**Standard printout** comprise 3 sections featuring numerous variables. Set for each variable that is to be enabled on the printout, set for each variable that is to be excluded from the printout.
To quickly change the settings press buttons located in the top right-hand corner.

| | |
|---|---|
| | Press to deselect all marked variables. |
| | Press to select all marked variables. |
| | Press to restore default variables. |

| HEADER PRINTOUT TEMPLATE | WEIGHING/LABEL PRINTOUT TEMPLATE | FOOTER/C LABEL PRINTOUT TEMPLATE |
|---|---|---|
| – Non-standard printout<br>– Dashes<br>– Working mode<br>– Date<br>– Time<br>– Device type<br>– Device ID<br>– Operator<br>– Full name<br>– Levelling<br>– Client<br>– Warehouse<br>– Product<br>– Packaging<br>– Universal variable 1…5<br>– Empty line | – Non-standard printout<br>– N (measurement number)<br>– Date<br>– Time<br>– Levelling<br>– Client<br>– Warehouse<br>– Product<br>– Packaging<br>– Series number<br>– Batch number<br>– Universal variable 1…5<br>– Net<br>– Tare<br>– Gross<br>– Current result<br>– Additional unit | – Non-standard printout<br>– Working mode<br>– Date<br>– Time<br>– Device type<br>– Device ID<br>– Operator<br>– Full name<br>– Levelling<br>– Client<br>– Warehouse<br>– Product<br>– Packaging<br>– Universal variable 1…5<br>– Dashes<br>– Empty line |

| | | |
|---|---|---|
| – GLP report<br>– Non-standard printout | – Mass<br>– MN-Method<br>– Reference tare<br>– Minimum sample<br>– Minimum sample status<br>– Mass value for titrator<br>– ID<br>– Non-standard printout | – GLP report<br>– Signature<br>– Non-standard printout |

**BASIC PRINCIPLES OF USING PRINTOUTS**

1. In order to print variables of the GLP PRINTOUT section, press button on the operation panel; only variables with attribute can be printed (see the above list).
2. Variables with attribute, present in the HEADER and FOOTER, are printed **ONLY** upon pressing **PRINT HEADER** and **PRINT FOOTER** pictograms. The pictograms have to be added to the bottom bar of the display as quick access buttons.
   *(For detailed instruction on how to add quick access buttons to the bottom bar of the display, go to section 12.3)*

| | |
|---|---|
| | |
| Print header data | Print footer data |

***Note:***
*Units for mass value printout:*

- *Net – main unit (adjustment unit)*
- *Tare – main unit (adjustment unit)*
- *Gross – main unit (adjustment unit)*
- *Current result – currently displayed unit*
- *Additional unit – additional unit*
- *Mass – main unit (adjustment unit)*

**Non-standard printout**
The printout may contain: TEXTS and VARIABLES (that are downloaded from the program upon printout). Every printout comes as a separate template, has its unique name that identifies it and is saved in the database.

**Procedure:**

1. Press <Non-standard printout>.
2. Press <Add > to open another window with data: Name/Code/Template.
3. Give a name and code for printout.
4. Press <Template>.
5. You will see a field with keypad for edition of the printout.
6. Using the keypad, design the printout; the printout may include texts and variables.

***Note:***

- *You can add printouts from the external memory by importing already configured texts via USB port.*
- *The name of the printout is ONLY A NAME and does not represent its content.*
- *The way of designing a non-standard printout is described in the point 20.9 <Printouts>.*

## 15.5. Profiles

The description of this function is included in the point 14 - Profiles.

# 16. WEIGHING

Put the load in question on the weighing pan. When you can see ◣◢ marker on the left side of the screen, you can read the weighing result.

You can save/print the weighing out by pressing <↵PRINT> key:

- in verified balances – only stable weighing result (◣◢ marker),
- in non-verified balances – stable or unstable result (no ◣◢ marker**)**, if the result is unstable, the <**?**> sign is printed before the mass value.

## 16.1. Selection of weighing unit

It is possible to change the weighing unit by pressing the unit in the weighing window, just next to the measuring result. After clicking the unit, you will see a list of available units. Select one of them to make the program automatically calculate the value of the specific unit.

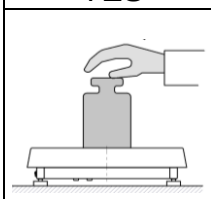
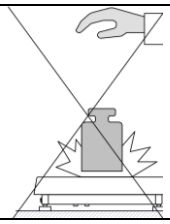
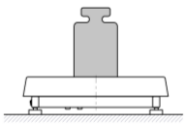
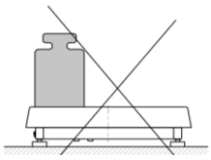
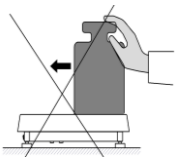
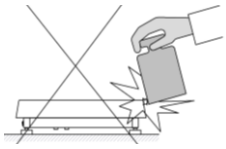
Options:

| *unit* | *designation* | *Verified balance* | *unit* | *designation* | *Verified balance* |
|---|---|---|---|---|---|
| gram | [g] | yes | Taele Singapore | [tls] | no |
| milligram | [mg] | yes | Taele Taiwan | [tlt] | no |
| carat | [ct] | yes | Taele China | [tlc] | no |
| pound | [lb] | no | Momme | [mom] | no |
| ounce | [oz] | no | Grain | [gr] | no |
| troy ounce | [ozt] | no | Tical | [ti] | no |
| pennyweight | [dwt] | no | Newton | [N] | no |
| Taele Hongkong | [tlh] | no | Mesghal | [msg] | no |

## 16.2. Correct weighing principles

To assure a long-term life and correct measurements of load masses, follow the guidelines below

- When starting the balance, do not load the weighing pan (permissible load upon activation is ±5% of the max. loading capacity).

| YES | NO | YES | NO | NO | NO |
|---|---|---|---|---|---|
|  |  |  |  |  |  |
| Load the weighing pan steadily avoiding shocks: Go to Setup/Misc./Vibrations detection parameter and enable control of weighing pan loading (for detailed information, read section 9.8). | | Place weighed loads centrally on the weighing pan. | | Avoid side loading, in particular side shocks. | |

Before making any measurements or in case of substantial changes to external conditions, calibrate the balance.

- Before making measurements, it is advisable to load the weighing pan with a weight similar to the max. loading capacity a couple of times.
- After removing the load, make sure the unloaded balance shows zero - →0← symbol, and check if the measurement is stable - symbol; if not, press
- Select weighing unit: press the unit next to the displayed mass 0.0000g or g-ct-lb key in the lower bar of the screen.

| | |
|---|---|
| At breaks between series of measurements, do not unplug the balance.<br>It is advisable to deactivate the balance display using the key in the top expandable menu of the device. | |
| To start the balance, click the key in the readout head of the device.<br>Once the start-up procedure has ended, the balance is ready for another weighing. | |

### 16.3. Balance levelling

The balance is equipped with a **Level Sensing System** that monitors the balance levelling. Thanks to this solution, you can constantly monitor the balance level while it is operating, which is signalled in the top right corner of the screen. The system supervises the balance levelling. In case the level changes, the system notifies of it in the display by changing the location of the level indicator and/or by activating the alarm and entering the balance level setting box.

**How to level the balance:**

- Press levelling condition icon in the top right corner of the screen.
- The screen will show the levelling control panel. You can see a balance view next to the level view.
- Level the balance by turning its legs as showed in the screen through flashing pictograms – level point will move towards the centre of the circle.
- When the point gets to the inner circle of the „level view", its colour will switch from red to green – it means that the balance has been properly levelled.

***Note:***
*The balance is equipped with the Automatic Level Control feature. For the description of operation, see point 25.9 of the manual.*

## 16.4. Balance zeroing

To zero the mass value, press key. The screen will show a zero value and symbols: →0← and ◣◢. Zeroing is tantamount to determination of a new zero point, treated by the balance as exact zero. Zeroing is possible only in case of the stable display value.

***Note:*** *It is only possible to zero the display value in the range of up to* ***±2%*** *of the max. load. If the zeroed value is higher than* ***±2%*** *of the max. load, the screen will show the error message.*

## 16.5. Balance tarring

To determine the net mass, put the load packaging and press key when the value has stabilised. The screen will show zero value of the mass and the following symbols: ***Net*** **and** ◣◢. After removing the load and packaging, the display will show the total value of tarred masses with a minus sign. You can also assign the tare value to the product in the database. If you do so, the balance will collect the tare value from the base automatically after you have selected the product.

***Note:*** *It is disallowed to tare the negative value. An attempt to tare the negative value will result in emergence of an error message. In such a case, zero the balance and retake the tarring procedure.*

**How to enter tare manually**
**Procedure:**

- Press quick-access key in any working mode.
- A numerical keypad will be displayed.
- Enter the tare value and press key.
- The balance will return to the weighing mode and the display will show the tare value with „-" sign.

**How to delete tare**
You can delete a tare value displayed by pressing the ZERO key on the housing or using <Disable tare> programmable key.

**Procedure 1** – after removing the tarred load from the weighing pan:

- press key,
- NET marker will be deleted. A new zero point has been determined.

**Procedure 2** – when the tarred load is on the weighing pan:

- press key,
- NET marker will be deleted. A new zero point has been determined,
- when the tare value exceeds 2% of the max. load, the screen will show –Err- message (operation is unfeasible).

**Procedure 3** – when the tarred load is on the weighing pan or after removing the tarred load from the weighing pan:

- press <Disable tare> programmable key,
- NET marker will be deleted,
- tare value will be displayed,
- press <Restore tare> key to restore the latest tare value.

## 16.6. Additional weighing-related parameters

By changing weighing-related settings, you can program the product to work in a specific way.

**Procedure:**

- Expand the side menu.
- The following menus will be displayed: Settings, Keys, Information, Printouts.
- Press a relevant menu and select the element that is to be modified.

<Parameters> menu – additional options related to weighing,
<Keys> menu – you can define quick-access keys,
<Information> menu – select information that is to be showed in the Info field,
<Printouts> menu – select the type of printout,
<Profile> menu – active profile settings.

<PARAMETERS> menu contains additional options related to weighing, such as:

- **Tare mode**
  Available options:
  - SINGLE:
    the value is remember after a single click of TARE key, further clicks set a new tare value. Selection of the product or packaging which the tare value is assigned to causes the previous tare to be deleted.
  - CURRENT TOTAL:
    currently entered tare value for the product and packaging are summed up (arising from selection of the product and packaging from the database). It is possible to add the manually entered tare value to this sum. After resetting the tare value for the product or packaging, the manually entered tare value will be disabled.
  - TOTAL OF ALL:
    subsequently entered tare values are summed up.
  - AUTOTARE:
    <u>Principle of operation:</u>
    Every first measurement is tared after reaching the stable condition. The screen will show NET and you can specify the net mass afterwards. After removing the load and returning to the autozero zone, the tare value is automatically deleted.
  - EVERY MEASUREMENT:
    it is possible to tare before every measurement in the series.

- **Automatic footer printout**

Available options:

MODE – None – footer manual printout.

Total of measurements – the footer will be printed out provided the mass value entered in the <Threshold> parameter has been exceeded.

Number of measurements – the footer will be printed out provided the specific number of measurements (series) specified in the <Threshold> parameter has been performed.

THRESHOLD – here you can specify the threshold limit for footer printout. For <Total of measurements>, the value will be defined in the mass unit [g], and for <Number of measurements>, the value will be dimensionless, specifying the number of measurements.

- **Printout/approval mode**
  - PRINTOUT/APPROVAL KEY (manual control)

    Never – inactive printout.

    First stable – the first stable measurement is recorded.

    Every stable – all stable measurements are accepted.

    Every – all measurements are printed out (stable and unstable), in verified balances only stable results (as in <Every stable> setting).
  - AUTOMATIC MODE

    Never – inactive printout.

    First stable – the first stable measurement is recorded after putting the load on the weighing pan, another stable measurement can be recorded only after removing the load from the weighing pan, after the value drops below the preset threshold and another load is placed on the weighing pan.

    Last stable – the last stable measurement performed before removing the load is recorded. It is recorded after removing the load from the weighing pan and when the value drops below the preset threshold.

    With interval – if selected, this option activates automatic printout and record of balance readout in the WEIGHING base via the cyclically specified interval. The interval can be set in [min] in <INTERVAL> parameter. The interval ranges from 1 s to 9h 59min 59s.

***NOTE:*** *Every result (stable and unstable when the balance is non-verified and only stable when it is verified) is printed out and remembered.*
*The automatic operation with interval starts upon activation of this feature. The first stable result that is higher than THRESHOLD value comes as the first measurement for printout and recording. Further measurements are printed out at the frequency corresponding to the set INTERVAL. To finish automatic operation with the interval, disable the option.*

  - THRESHOLD

    mass value for automatic printout, set in grams.
  - INTERVAL

    frequency of recording the value for automatic operation with interval
- **Statistics**

  It contains settings for statistical calculation during operation.

  Available options:
  - Global: statistical calculations are performed for all subsequent measurements, regardless of the product
  - Product: statistical calculations are performed for particular products

# 17. DRYING – GENERAL INFORMATION

**<Drying>** mode allows you to determine the content of moisture in a specific substance by drying the sample off. After you start the procedure, the device checks the loss of the mass of the sample located in the drying chamber and subjected to heating. Based on this, the program calculates the content of moisture and the result is displayed in the home screen. The result is updated on a continuous basis throughout the procedure that ends automatically after all operator's conditions have been met.

## 17.1. Preparation of samples for drying

This part of the manual presents information on how to obtain optimal measurement results during testing. Here are principles of selecting particular drying parameters, depending on the test material.

### 17.1.1. Moisture measurement in the moisture analyser

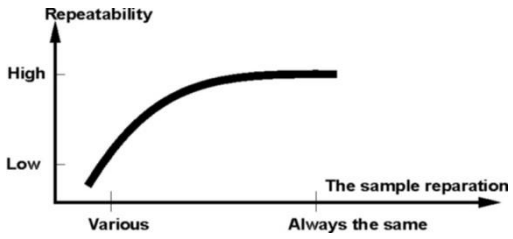
The moisture content in the sample is measured on the basis of the measurement of sample mass losses while it is heated (evaporated).
The RADWAG moisture analyser is composed of two parts: a precise balance and drying chamber. In relation to traditional methods of determining moisture, the measurement in the RADWAG moisture analysers is faster and does not require additional mathematical calculations (moisture result is continuously displayed throughout testing).
Irrespective of the moisture determination method, the precision of measurement is determined by preparation of the sample and selection of suitable testing parameters, such as:

- sample size,
- sample type,
- microwave power,
- drying time.

In reality precision of measurements happens to be less important than speed of obtaining results (engineering process control). Thanks to sample heating (e.g. by microwaves) adopted in the device, the measurement is very quick. Measuring speed can be increased through optimal setting of device parameters, depending on tested materials. The optimal **microwave power** and **drying time** depend on the type and size of the sample as well as expected measurement precision. **These parameters can only be selected on the basis of test measurements.**

### 17.1.2. Collection and preparation of samples

The nature, preparation and size of the sample are important factors that influence measuring speed and accuracy. The method of collecting and preparing the sample has a considerable impact on repeatability of measurement results as the sample must be a representative part of the entire test material.



The final result of the measurement is widely dependent upon the precise and well-thought-out preparation of the sample. The ready sample used for analysis must represent the entire test material. The sample preparation procedure must specify the following: method of sample collection, fragmentation method, size of fragmented particles, homogeneity and other. The very preparation procedure must be performed relatively fast to prevent the loss or absorption of moisture from the surrounding. The sample preparation standards must be elaborated as per individual needs that depend on the test material, as well as consistency and size of the test sample.

**Number of samples**

The higher the number of samples in testing, the higher the statistical measurement certainty. The number of samples depends on the material homogeneity, its purity, precision of measuring method as well as expected accuracy of results.

**Mechanical fragmentation of material for measurements**

The fragmentation method must be selected for the test material. Hard and crumbly materials can be cut. Grinding would cause these materials to heat and lose moisture, eventually leading to unreliable measurement results. If grinding is the only way of preparing the sample for measurement though, potential moisture losses must be countable.

**Use of quartz sand**

For the sake of optimal drying effect, the sample must be as large as possible, allowing the moisture to evaporate. The moisture measurement results for the substance in the form of a shell (e.g. glucose syrup) or for doughy material (e.g. butter) can have enhanced credibility if the sample is mixed with (dried) quartz sand.

**Fats in the form of pastes or melting substances**

These substances must be tested using a glass fibre filter for increased active evaporation surface through separation substances between fibres. Pre-drying of the filter is required only for measurements that are expected to be highly precise.

**Liquid substances**

In such cases it is reasonable to use a glass fibre filter for shorter measuring time. The filter is used to separate the test liquid around fibres and raise the active evaporation surface. Pre-drying of the filter is only required for measurements that are expected to be highly precise.

**Leather-structure or thermosensitive substances**

With regard to such substances, it is essential that a glass fibre filter is used. When testing, the substance must be placed on the weighing pan and the sample surface must be covered with the filter that secures the sample against direct impact of heat radiation. In this case the sample is heated through convection (milder than radiation).

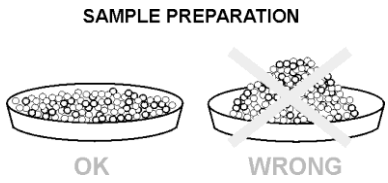
**Sugar-rich substances**

When it comes to such materials, testing is frequently accompanied by caramelisation on the surface of the sample. Therefore it is necessary to use a thin layer of the sample and moderate drying temperature.

### 17.1.3. Distribution of sample on the weighing pan

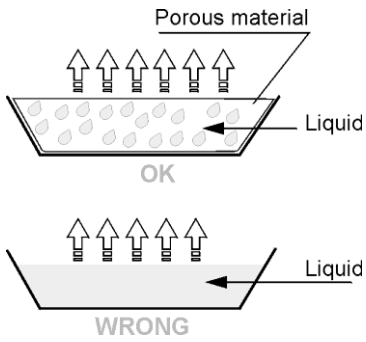
**Loose materials**

Dried in their natural state, i.e. in their natural form or disintegrated. Sample disintegration causes smaller dispersion between the following measurements. Sample mass should not be too high, and the sample should be evenly spread on whole surface of the drying pan.



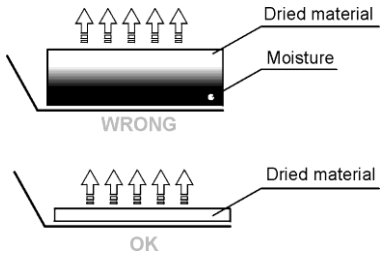

**Liquid substances**

Semi-fluid substances are dried in their natural form. Large amount of grease (fat) occurring in some of substances makes moisture content determination difficult. In such case it is recommended to use additional components, which increase sample's active surface and aid moisture content releasing process from a sample. Such components are high silica sand, blotting paper or filter. Before drying a tested substance, initially dry the additional component, so that its humidity is close to zero.



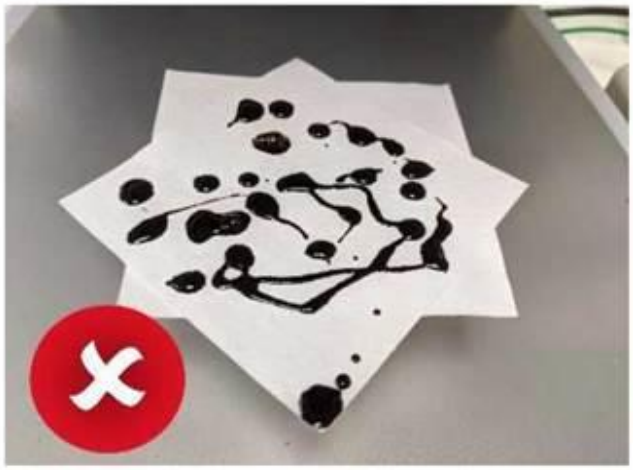

**Solid objects**

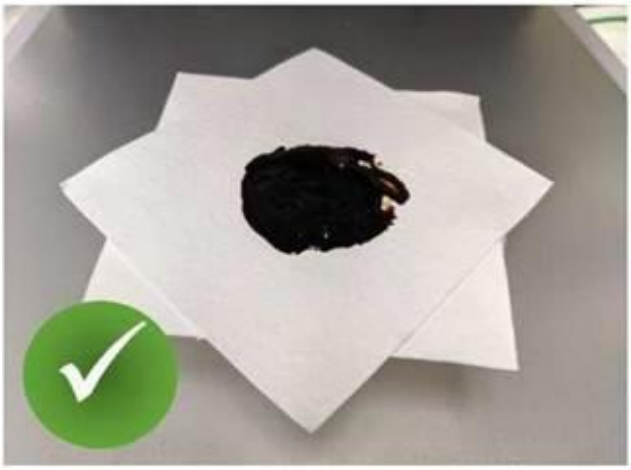
Depending on solid object's structure (dense or loose), moisture content determining process may take short or long time. The size of solid's surface determines the speed of drying process, and measurement reliability. Thus, the surface of a solid object should be as large as possible. Since solid objects release moisture through their outer surface, sample thickness is another important factor.




**Distribution of the sample on the filter:**

The sample must be evenly distributed on the filter using a spatula. The layer of the sample must be as thin as possible.

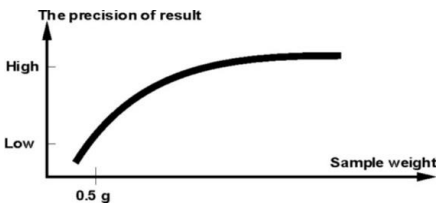


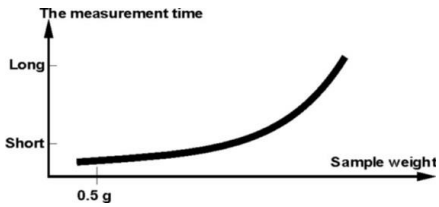


# 18. SELECTION OF DRYING PARAMETERS

## 18.1. Selection of optimal sample mass

The sample mass influences the precision of the measurement result and measurement time. The higher the mass of the sample, the higher the amount of water that must be evaporated. It eventually means longer measurement time. Short testing time is possible in case of small-mass samples. However, to have the required measurement accuracy, the mass must not be too small.




## 18.2. Impact of sample mass on repeatability of results

The sample mass has a substantial impact on repeatability of results obtained with the use of the moisture analyser. The relation between the sample mass and repeatability has been show in the table below.

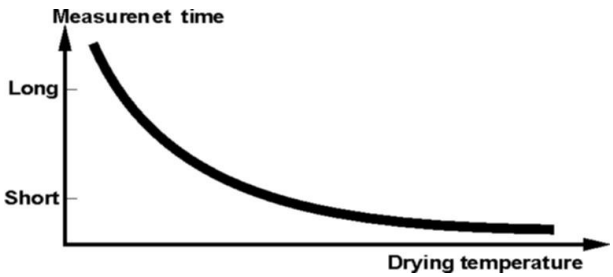
| Sample mass | Repeatability |
|---|---|
| ~ 2g | 0,05% |
| ~ 10g | 0,01% |

The data in the table refer to an ideal and homogeneous sample, assuming the moisture has been evaporated from the sample during the measurement and the sample has not decomposed (e.g. wet quartz sand).

The results are always subject to some uncertainty related to the sample and repeatability of the moisture analyser. In reality it means that the measurement result may exceed repeatability values showed above.

## 18.3. Drying temperature

The drying temperature has a major impact on drying time. Its value depends on the kind of material used. Too low temperature results in partial evaporation of water (incomplete drying of the sample) and in effect unnecessarily prolonged measurement time. Too high temperature in turn causes the material to burn (sample overheating, chemical decomposition). The drying temperature for the traditional method is stipulated in the industry standards or company standards. If no standards apply, the temperature must be chosen experimentally.



When choosing the drying temperature, remember to do the following:

- assess the content of moisture in the sample,
- specify the chemical decomposition temperature through experiments,
- compare the result from the moisture analyser with the result obtained through the traditional method.

When drying a sample with a high content of moisture, it is possible to shorten the measuring time by selecting the fast profile. If this is the case, the largest part of moisture is emitted at a higher temperature in relation to the drying temperature. Only after some time is the temperature reduced to the drying temperature and maintained until the end of the measurement.

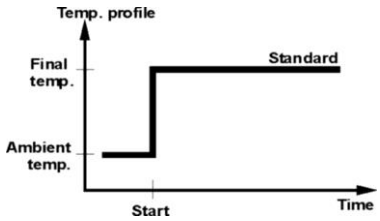
### 18.4. Selection of the drying profile

The moisture analyser allows you to select one of four drying profiles:

- Standard
- Fast
- Mild
- Step-wise

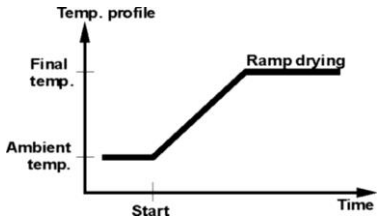
**STANDARD profile**

Standard profile is the most frequently used of all drying profiles. It enables accurate determining of moisture content in a dried sample.



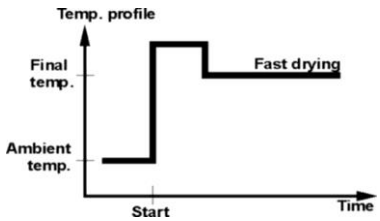

**MILD profile**

Mild profile is used in case of 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 from decomposing of substances sensitive to heat by mild temperature increase in set amount of time (time interval has to be selected by tests). Mild profile is recommended to drying samples of leather structure.



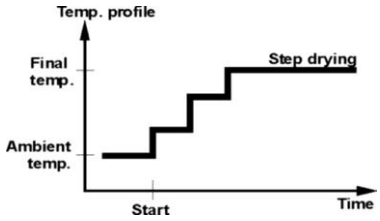

**FAST profile**

Fast profile is recommended to drying samples that moisture content varies from 5%, and 15%. In the initial stage of Fast profile, heating takes place at full power of the filaments, causing heating the drying chamber to increased temperature (maximum temperature value is higher by 30% from set drying temperature). Overheating compensates heat loss during evaporation of large moisture content in the test's initial stage.




**STEP profile**

Enables determining up to three steps with random drying temperature. 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.



## 18.5. Selection of drying time

To specify the drying time, it is necessary to choose a suitable drying end criterion. It means that the moisture analyser must see that specific criteria (mass in time, time) have been met to be able to automatically end the drying procedure.

Drying may terminate after a specific period of time, irrespective of the loss of mass. It applies to substances that may decompose during the test and their mass cannot be fixed.

The second condition for termination may be lack of sample mass loss (less than 1 mg) in the specific period of time.

**Automatic termination**

There are several ways of terminating the drying procedure. Termination can be:

- 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-based (max. time 99h 59min.).
- Manual (a button must be pressed).
- Defined 1 (enter the change of mass □m 0,1-9,9mg and change of time □t max 2,55sec.
- Defined 2 (enter the change of humidity □%M in time 60s).
- Test (selection of auto-shutdown parameters for the sample is allowed).

**Automatic termination – freely defined criteria (mass/time)**
The operator can define a limit value for the loss of mass and period of time in which the loss cannot exceed the preset value. When the device reaches the preset criterion, the measurement will be automatically terminated.

**Automatic termination – freely defined criteria (change of moisture)**
The operator can define a limit value for the loss of moisture within 60 seconds. When the device reaches the preset criterion, the measurement will be automatically terminated.

**Manual termination**
The operator must press a STOP key to manually terminate the measurement.

**Time-based termination**
The measurement is terminated when a preset period of time expires, regardless of the result.

# 19. DRYING PROCEDURE

The drying result is calculated according to the following formulas:

**Moisture content:** $\%M = (m_1-m_2)/m_1*100\%$

**Dry matter content:** $\%D = (m_2/m_1)*100\%$

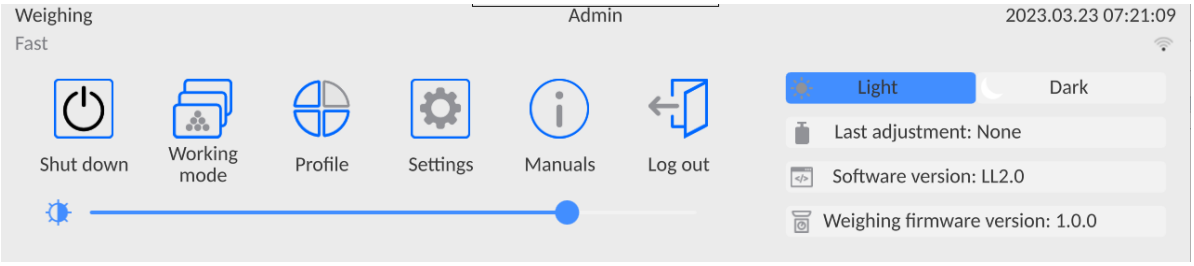
$\%R = (m_1-m_2)/m_2*100\%$

Where: $m_1$ – wet sample weight
$m_2$ – dry sample weight

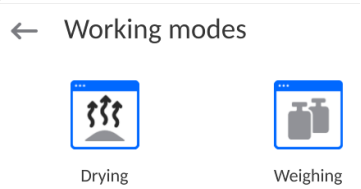
## 19.1. How to activate working mode

To change the working mode, do as follows:

- Expand the menu at the top of the screen.




- Press <Working mode>
- A list of modes will be displayed in the screen.

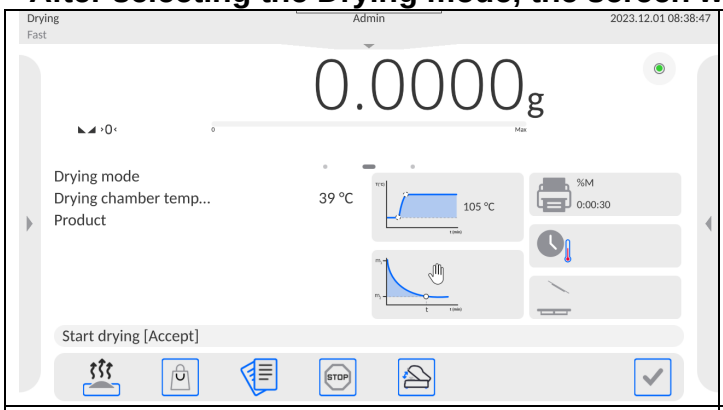



- Select <Drying> mode name and the specific mode will activated automatically.

**The Info field contains the following information:**

- Drying program,
- Product.

**After selecting the Drying mode, the screen will show the following keys:**

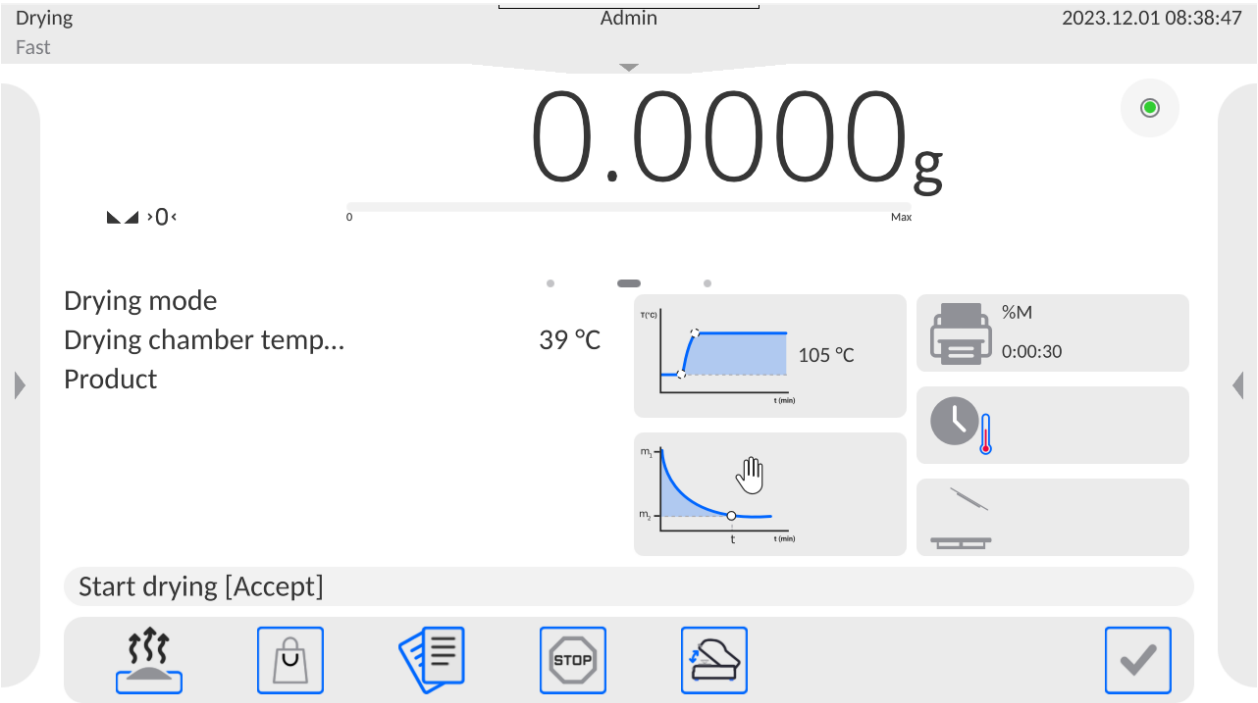
| | |
|---|---|
|   | 1. Program base – access to a drying program base.<br>2. Product base – access to to a product base.<br>3. Drying program information<br>4. Emergency/instant termination of the drying procedure<br>5. Open/Close drying chamber<br>6. Drying start. |
| 1 2 3 4 5 6 | |

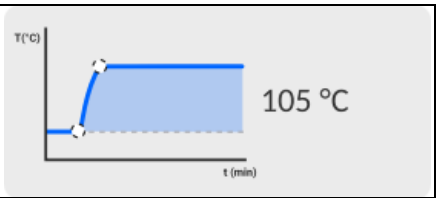
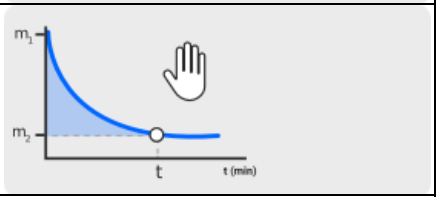
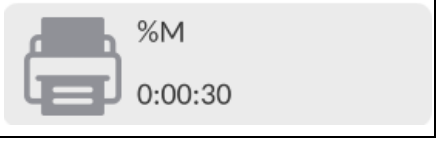
## 19.2. Drying parameters settings

You can set drying parameters in the way presented below.

### 19.2.1. Use of fields in the home screen

This option allows quick configuration of particular drying parameters with no need to go deeper in the menu. To gain access to drying parameters, you need to click active fields in the screen.
Three fields are available:

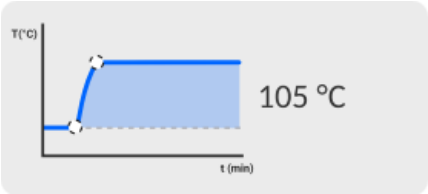



| | | |
|---|---|---|
| 1 | This field allows setting the drying profile and profile-related parameters (dependent upon a profile type). |   |
| 2 | This field allows setting the method of terminating the drying procedure together with its parameters (dependent upon a termination type). |  |
| 3 | This field allows setting the nature of data that are displayed and printed during drying and time break between subsequent moisture content printouts. |   |

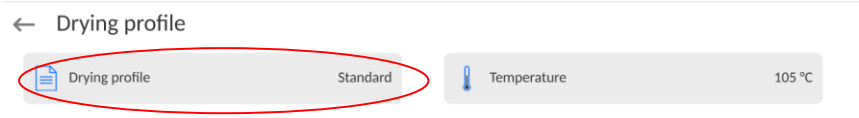
***Note:***
***This option is inactive when any drying program saved in the program base has been chosen for execution.***

## DRYING PROFILE

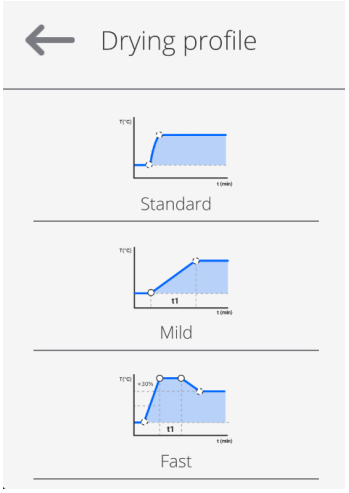
To enter the profile selection and settings, click the profiles field in the screen.



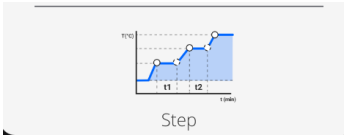

After you have clicked, you will see a profile selection window. To change the profile, click the profile name field.



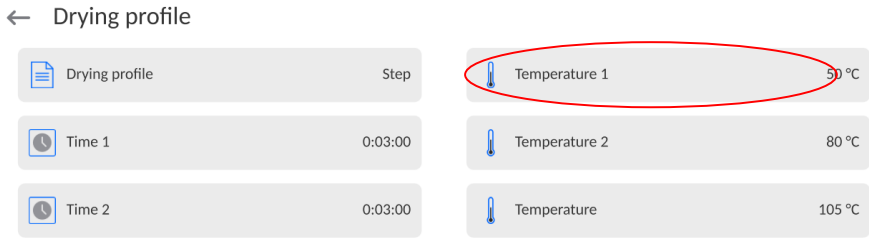

The profile type selection window will be displayed in the screen.



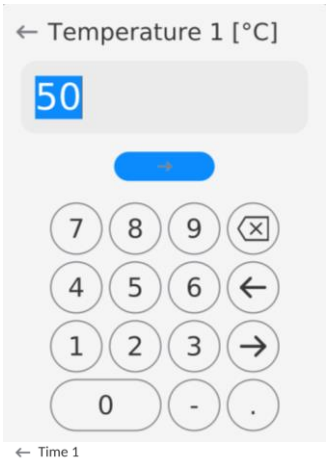

Select a suitable profile.




The previous window will be restored and data displayed will apply to the profile you have selected.
To adjust the profile parameters to your needs, click the name of data to be edited.

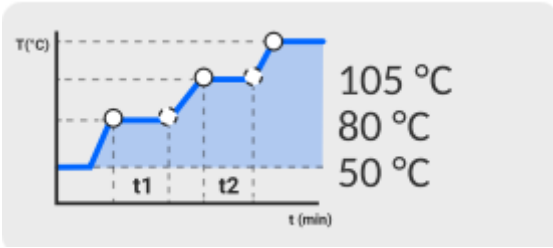


**The example of drying temperature edition window.**
Enter the power value using the numerical keypad and confirm.




**The example of drying time edition window.**
Enter the heating time at a specific temperature for particular thresholds using the numerical keypad and confirm.

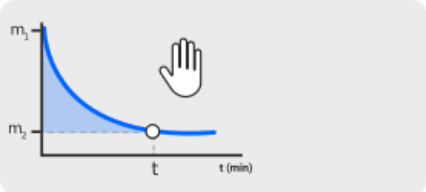
Once you have set the data, return to the Drying mode home screen. In the profile box you will see a tip with the profile you have selected and set powers.



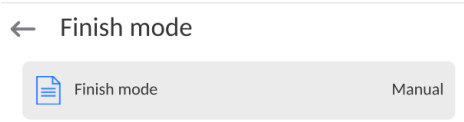

***Note:***
*For the fast and step-wise profile, you need to enter heating time at the increased temperature (fast profile) or particular thresholds (stepwise profile). The aforementioned time starts running when the moisture analyser reaches the temperature for a specific threshold.*

## TERMINATION METHOD

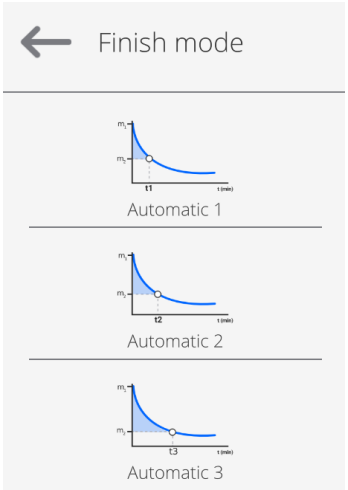
To enter the selection and setting of the termination method, click the field dedicated to these settings in the screen.



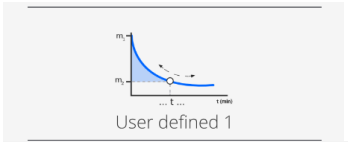

Once you have clicked, you will see a drying termination method selection window. To change settings, click the name field.



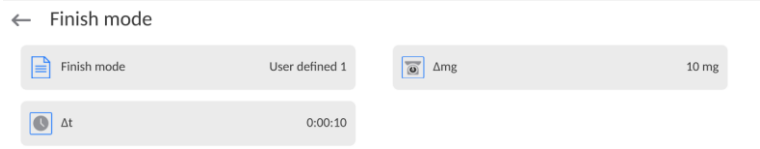
A termination method selection window will be displayed. Use arrow keys to make the desired setting.



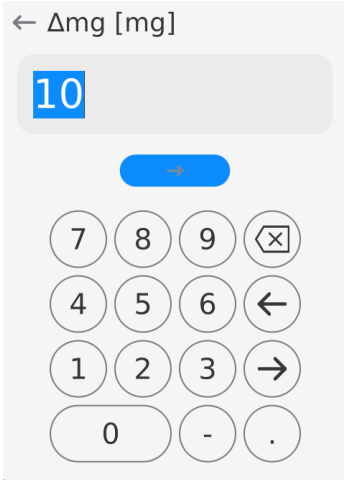

Select a suitable termination method.



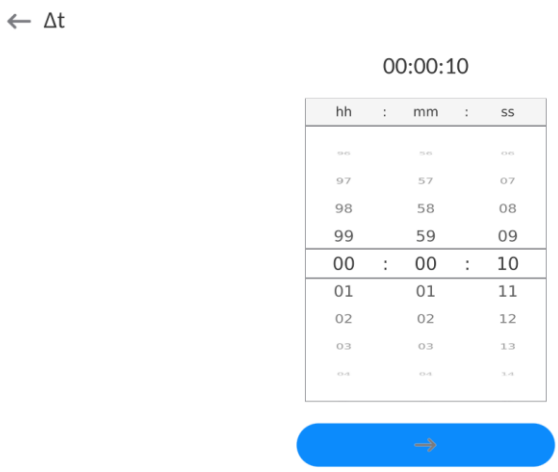

The previous window will be restored and the data that show up in the screen will apply to the setting you have selected.
To adjust parameters to your needs, click the name of data to be edited.



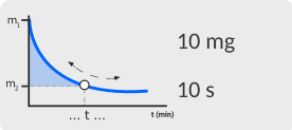

**The example of mass change edition window.**
Enter the mass value using the numerical keypad and confirm.




**The example of the time section edition window.**
Enter the time value using the numerical keypad and confirm.

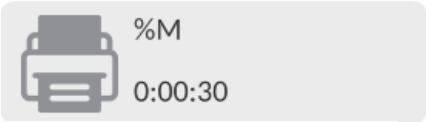


Once all data have been set, return to the Drying mode home screen. The window will show tips with settings for the method of terminating the drying procedure.

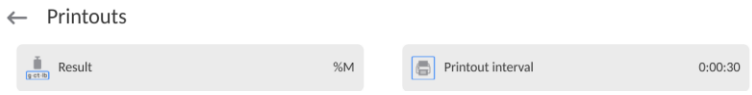



**PRINTOUT**

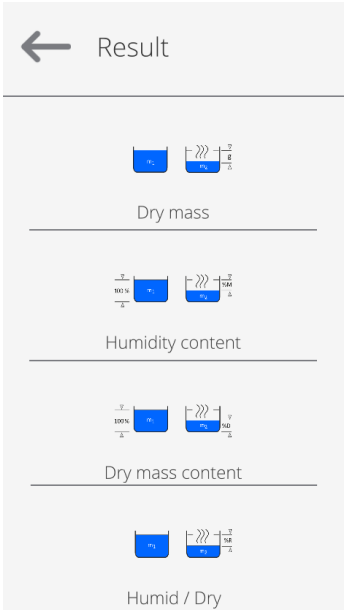
To enter the selection and setting of data concerning the measurement printout, click the relevant settings field in the screen.




Once you have clicked, you will see a relevant settings windows. To change settings, click the <Result> name field.



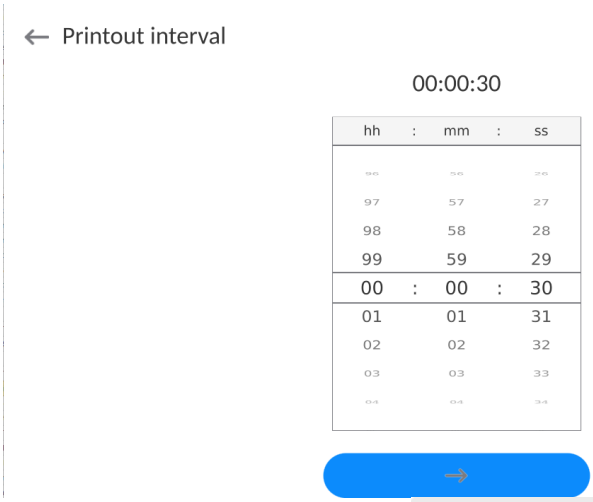

A unit selection window will be displayed.
Using arrow keys, make the desired setting.
Potential settings: %M; %D; %R; m [g].



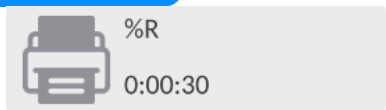

Select the desired profile.

**The example of the time change edition window.**

Enter the time value using the numerical keypad and confirm.




Once all data have been set, return to the Drying mode home screen. The printout window will show tips with specific settings for printout.



### 19.2.2. Navigation in <Parameters> menu

Once you have entered the settings, you can define all drying parameters and main data for measurement printout (type of data and time interval between printing further measurements). The data can be defined in the menu window.

**Procedure:**

1. Press the grey information field.
2. The following menus will be displayed: Settings, Keys, Information, Printouts, Profile.
3. Press <Settings> menu.
4. The screen will show functions related to checkweighing, such as:
   - **Drying profile** [sample heating method],
   - **Termination method** [drying termination criteria],
   - **Result** [unit of moisture that the drying procedure starts with],
   - **Printout time** [time breaks between subsequent printouts of data on measurement],
   - **Start mass control** [activation/deactivation of sample start mass condition satisfaction with declared mass tolerance (mass and sample tolerance can be set in the product base)],
   - **Autotare** [activation/deactivation of the automatic tarring of disposable weighing pan mass upon activation of the drying procedure],
   - **Print measurements** [printing measurements of indirect determination of moisture at the frequency set in <Measurement time> parameter].

The method of setting particular parameters is identical to the previous option. The only difference is possibility of declaring settings for the sample start mass control.
The parameter specifies a need to use the sample for testing moisture of a specific mass.

For START MASS CONTROL, you can choose one of three variants:

**None** – option is inactive, the mass of the prepared sample is not checked by the program.

**Optional –** option is active, the screen displays a bargraph that shows the location of the sample mass (in a graphic form) in relation to the mass saved in the product base as mass of sample and tolerance value for this mass. Before using the option, add the product together with data on sample mass and weighing tolerance to the product base. After selecting this option, the moisture analyser will advise the operator through relevant messages on placing the suitable amount of material on the weighing pan. If the operator chooses to do otherwise, the device will start drying even if the mass is not within the mass tolerance range for the specific product.

**Required** – option is active, the screen displays the bargraph that shows the location of the sample mass (in a graphic form) in relation to mass saved in the product base as a sample mass and tolerance value for this mass. Before using the option, add the product together with data on sample mass and weighing tolerance to the product base. After choosing this option, the moisture analyser will advise the operator through relevant messages on placing the suitable amount of material on the weighing pan. For this option, the program does not start drying until the suitable amount of sample is placed on the weighing pan so that its mass is within the mass tolerance range for the specific product.

There are two ways you can use the option:

1. For any product, use quick-access keys: <**Checkweighing thresholds**> or <**Target value**>.
2. In combination with a specific product placed in <**Product base**>.

In the case of the first method, threshold values or target mass and mass percent tolerance must be entered using the quick-access keys.
With regard to the second method, the mass value and tolerance field must be entered in <Product base> in a relevant place for the product.

**HOW TO SET THE SAMPLE MASS TOLERANCE FIELD:**

**MIN and MAX thresholds**: the ingredient mass is considered as correct by the program if the mass falls between MIN and MAX thresholds (data in the product base).
**TOLERANCE**: the ingredient mass is considered as correct by the program if the mass falls within the assumed percent tolerance of the ingredient total mass (±%) - (data in the product base).
Before drying is initiated, declare the minimum and maximum mass of the sample that is to be placed on the weighing pan or the target mass and percent tolerance for this mass to start the procedure.

1. It is possible to define Min/Max threshold values in the Database while editing the Product or through <Checkweighing thresholds> quick-access key.

**Procedure:**

- Press the grey Info field and then <Keys>.
- Assign <Checkweighing thresholds> option to one of the on-screen keys.
- Return to the drying function.
- Press <Checkweighing thresholds> and enter the value for the Min and Max Threshold, return to the drying function.
- Following <PREPARE SAMPLE>, a glowing LCD slat in the lower part of the head will be active. The slat will display current mass through its colours.
- Yellow: current mass lower than Min Threshold.
- Green: current mass between thresholds.
- Red: current mass higher than Max Threshold.

2. To define the value of target mass, <Target value> quick-access key must be pressed.

**Procedure:**

- Press the grey Info field and then <Keys>.
- Assign <Target value> to one of the on-screen keys.
- Return to drying.
- Press <Target value> and enter the mass to be achieved.
- Next enter the tolerance in target mass percent into +/- (allowed range: 0 – 100%).
- Following <PREPARE SAMPLE>, a glowing LCD slat located in the lower part of the head will be active. The slat will display the current mass through its colours.
  Yellow: current mass lower than Min Threshold.
  Green: current mass between thresholds.
  Red: current mass higher than Max Threshold.

***Note:***
*Checkweighing threshold and target mass functions can operate simultaneously during the drying procedure. If this is the case, the role of sample mass tolerance is taken over by Min and Max thresholds. After selecting the product (from the base) that has been assigned target mass values and Min and Max thresholds, the program will primarily take into account Min and Max threshold masses during the start mass control. To change these values before drying, use quick-access keys. New values are temporary values and are not saved in the database for the product.*

### 19.2.3. The use of program base

The drying procedure can be performed as per the program saved in <Drying program base>.

**How to enter the program into the Drying Program Base**
The program base contains saved drying programs that can be called before the sample is tested. Adding programs is easy and intuitive. Thanks to relevant messages, the operator can take further steps.

**Procedure:**

- Enter <Database> submenu and press <Drying program base> field.
- Press <Add> key if you want to add a new program.

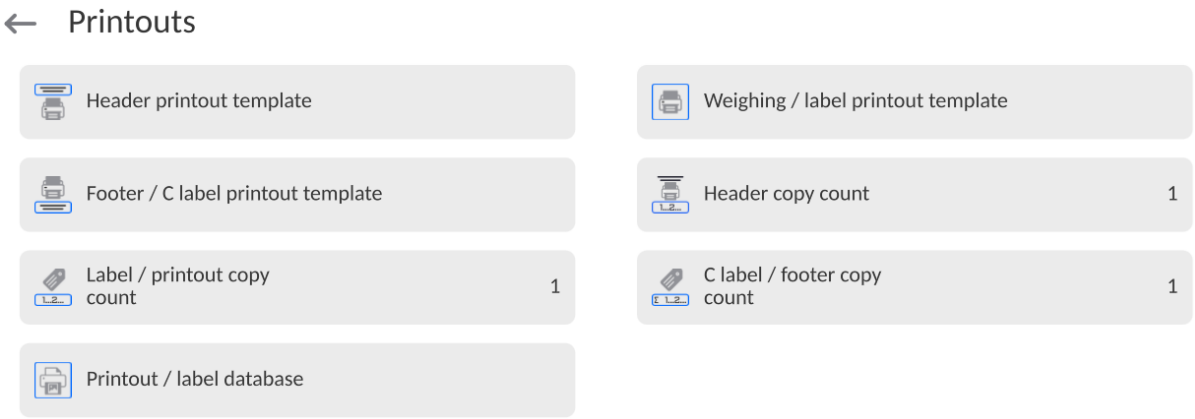
The program will add a new item to the base automatically and proceed to the edition box. Enter all data related to the new program.
The list of information that is defined for the program:

1. **Name**: click the name field to open a new window in which you need to enter the program name.
2. **Code**: enter the program code here.
3. **Drying profile**: after clicking this field, you will see a window with the drying profile that is suggested by the program. Follow the previous steps to select a suitable profile and enter expected profile date (drying power, time, sample max. temperature).
4. **Termination method**: click this field to open a window with the termination method that is suggested by the program. Follow the previous steps to select a suitable method and enter expected data (mass, time).
5. **Result**: click to open a new window with the unit suggested by the program. Follow the previous steps to select a suitable unit.
6. **Printout time**: click this field to open a new window with a numerical keypad. Follow the previous steps to enter the length of breaks between subsequent measurement printouts during the drying procedure.
7. **Start mass control**: click to open a window with a list of selectable options. Select one of the following: **None, Optional, Required.** The program will display the program data window again.
8. **Equipment related to sample**: click to open a new keypad window in which you can enter equipment required for proper drying procedure, e.g. a need to use a glass fibre filter.
9. **Sample preparation**: click to open a new keypad window in which you can enter the description of collection and preparation of the sample together with description of distribution on the weighing pan.
10. **Recommended sample size:** click to open a keypad window in which you can enter the recommended size of the sample adapted during testing.

After entering program-related data, return to the home screen of the program.

## 19.3. Printouts in drying mode

<Printouts> menu consists of three settings. The first is standard printouts: <Header printout template>, <Weighing/label printout template>, <Footer/C label printout template>, the second is non-standard printouts: <Printout/label base>, and third is parameters allowing you to set printout quantities: header, weighing and footer. To do so, single click the printout call key.




**Standard printouts** are composed of three sections that contain various variables. For each variable, you need to set – if it is to be printed out or – if it is not to be printed out.
You can quickly change selection of variables to be printed out, using keys in the top right corner of the screen.

| | |
|---|---|
| | Press to deselect all marked variables. |
| | Press to select all marked variables. |
| | Press to restore default variables. |

**Procedure:**

1. Press the field with the name of the template to be edited (Header – Weighing – Footer) and select variables that are to be printed out.
2. If you have chosen the non-standard printout, create it.

The drying procedure entails a drying report. The report contains all printout data for the header, weighing and footer. It means that every report that is printed during the drying procedure and saved in the report base takes the form selected by the operator.

***Note:*** *The content of data for each measurement in the report must be set in <Weighing printout template>. Every time the report is printed out, only the data that are assigned <YES> option in <Weighing printout template> will be printed out in the place of measurements.*

Content of particular printouts:

| HEADER PRINTOUT TEMPLATE | WEIGHING/LABEL PRINTOUT TEMPLATE | FOOTER/C LABEL PRINTOUT TEMPLATE |
|---|---|---|
| – Non-standard printout<br>– Dashes<br>– Working mode<br>– Date<br>– Time<br>– Device type<br>– Device ID<br>– Operator<br>– Full name<br>– Levelling<br>– Client | – Non-standard printout<br>– N (measurement number)<br>– Date<br>– Time<br>– Levelling<br>– Client<br>– Warehouse<br>– Product<br>– Packaging<br>– Series number<br>– Batch number<br>– Universal variable 1…5 | – Non-standard printout<br>– Working mode<br>– Date<br>– Time<br>– Device type<br>– Device ID<br>– Operator<br>– Full name<br>– Levelling<br>– Client<br>– Warehouse |

| | | |
|---|---|---|
| – Warehouse<br>– Product<br>– Packaging<br>– Universal variable 1…5<br>– Empty line<br>– GLP report<br>– Non-standard printout | – Net<br>– Tare<br>– Gross<br>– Current result<br>– Additional unit<br>– Mass<br>– MN-Method<br>– Reference tare<br>– Minimum sample<br>– Minimum sample status<br>– Mass value for titrator<br>– ID<br>– Non-standard printout | – Product<br>– Packaging<br>– Universal variable 1…5<br>– Dashes<br>– Empty line<br>– GLP report<br>– Signature<br>– Non-standard printout |

## 19.4. Drying procedure report

A report is generated after completion of each drying procedure. It is saved in <**Drying reports>** database. The name of the report file takes a form of a procedure completion date and time.

**Example of the report:**

---

| | |
|---|---|
| *Start date* | *2012.06.25* |
| *Start time* | *14:41:55* |
| *Operator* | *Admin* |
| *Product* | *Tea* |
| *Drying profile* | *Standard* |
| *Termination method* | *Automatic 3* |
| *Start mass* | *? 0,386 g* |
| *0:00:30* | *1.295 %M* |
| *0:01:00* | *0.777 %M* |
| . | |
| . | |
| *0:06:00* | *1.295 %M* |

---

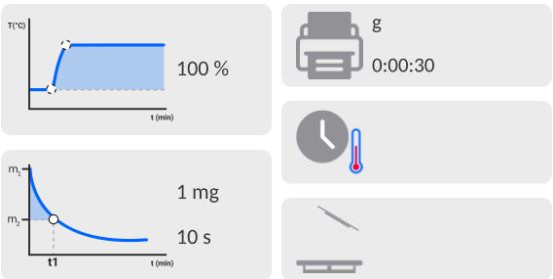
| | |
|---|---|
| *Status* | *Ended* |
| *Completion date* | *2012.06.25* |
| *Completion time* | *14:48:05* |
| *Drying time* | *0:06:10* |
| *Final mass* | *0.381 g* |
| *Current result* | *1,295 %M* |

*Signature* ……

---

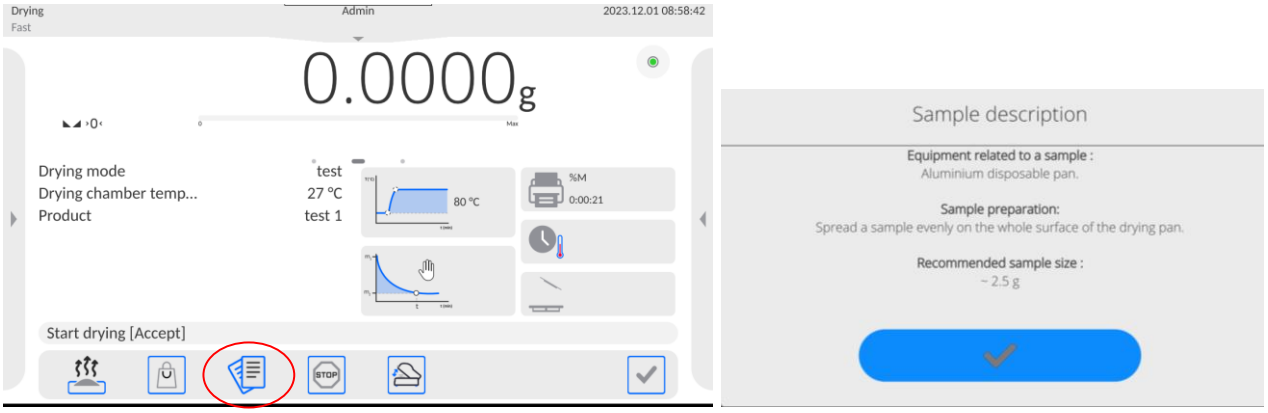
## 19.5. Drying method

The lower part of the screen displays settings for the drying procedure in the form of pictogram fields.



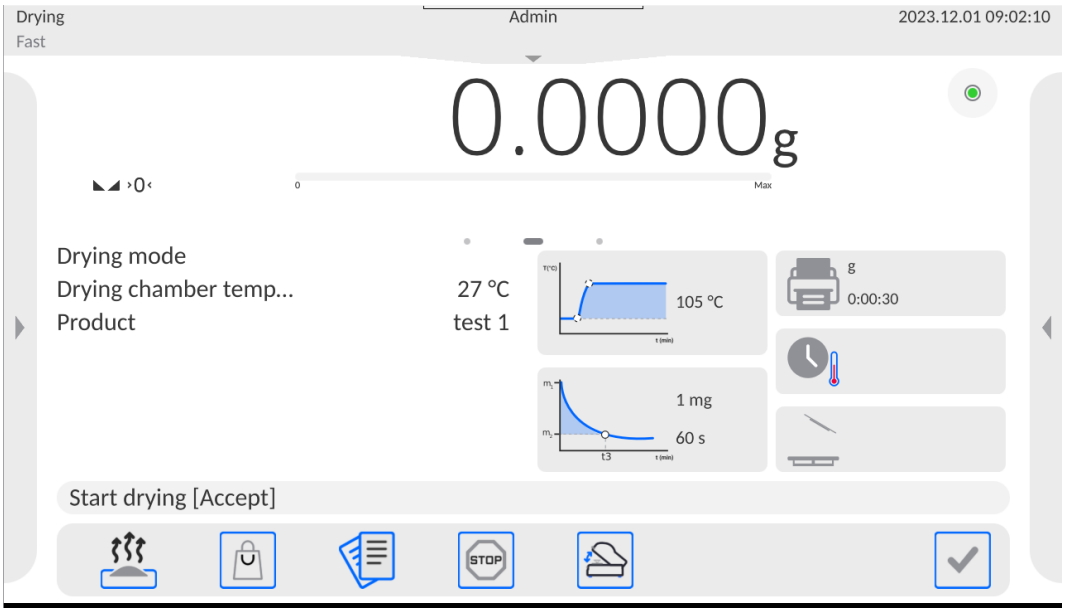
If the parameters are incorrect, change them so that they correspond to drying parameters of the sample that is to be tested.
The method of setting parameters has been described in the previous point of the manual.
If the drying program from the base is to be used, do as follows:

- Enter <Database> submenu and press <Drying program base> field.
- Select the drying program by pressing its name. The moisture analyser will display the home screen and the info field will display the name of the program you have selected. The drying parameters fields will show parameters chosen for the specific program.
- After selecting the program, you cannot change set values of particular drying parameters. It is only possible when no drying program has been selected.
- Additionally you can display (for a specific drying program) descriptions concerning the additional equipment, sample preparation and recommended sample size.
- To use this option, activate <Sample description> key in the key bar.
  Press the key to display a window with descriptions entered in the drying program.



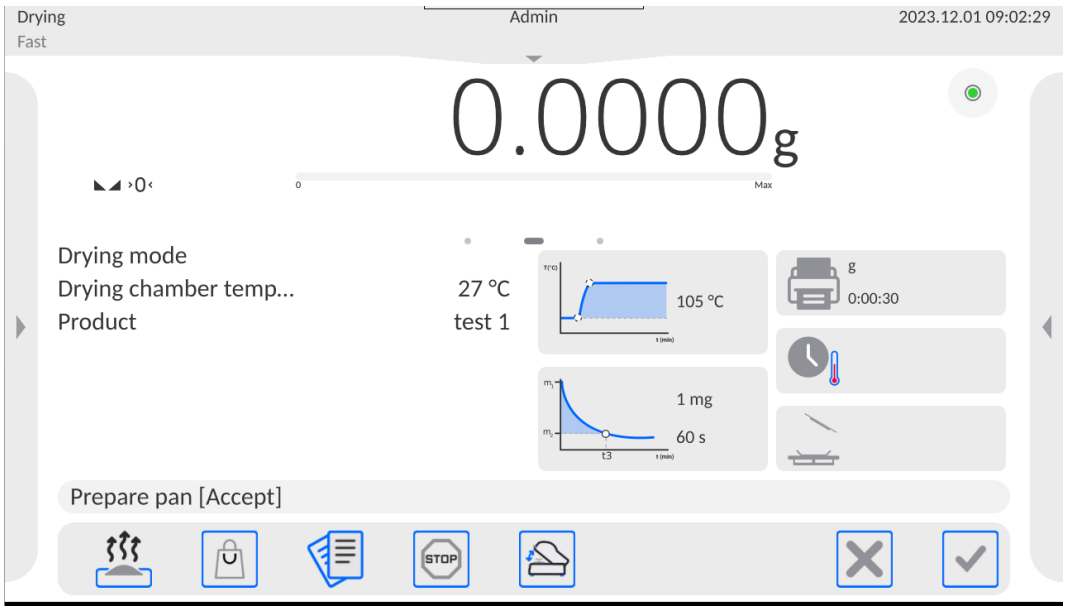

**Note:**
The option is available only after selecting the program from <Drying program base>.

If the parameters are correct, you can start testing.



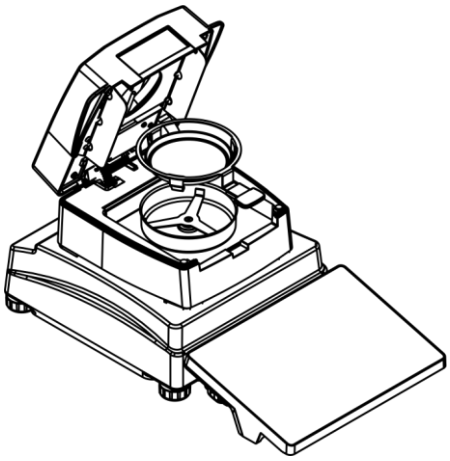

To start drying, press ☑ key. The moisture analyser program will display subsequent messages that help you to use the device. Follow these messages. Thanks to this

adherence, you will be able to correctly prepare the sample and conduct the moisture content determination procedure.




Through the message, the program will tell the operator to prepare the weighing pan.

Place the disposable weighing pan in the holder and position it on the cross.

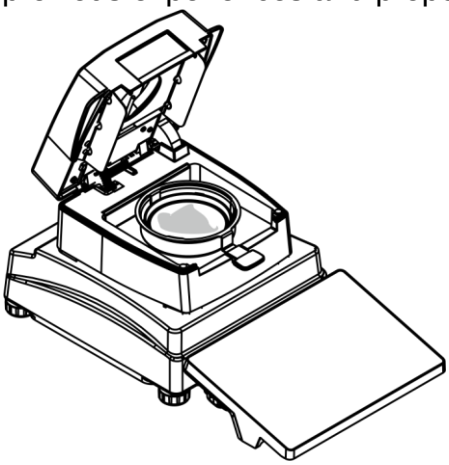


The weighing pan mass will be showed in the screen. To assure stable tarring conditions, close the drying chamber.

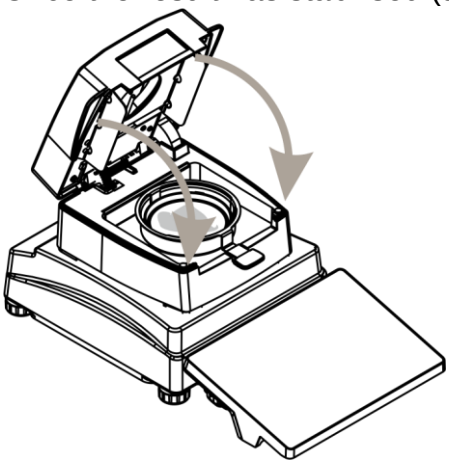
Press ✓ key to tare the weighing pan mass and enter the tare value into the moisture analyser memory. The mass value will be ZERO and another message will be displayed.

*NOTE:*
*If the AUTOTARE option is active, before you start drying, please remember to put the disposable weighing pan on the cross and press* ☑ key afterwards. The mass of the weighing pan will be automatically tarred and the program will display <Prepare sample> message.

If <START MASS CONTROL> option was active, a bargraph will appear in the info field. The bargraph will show the size of the sample mass in relation to data on Min and Max thresholds of the sample.
Place the sample on the weighing pan. Select the sample mass on the basis of your previous experiences and properties of the test material.

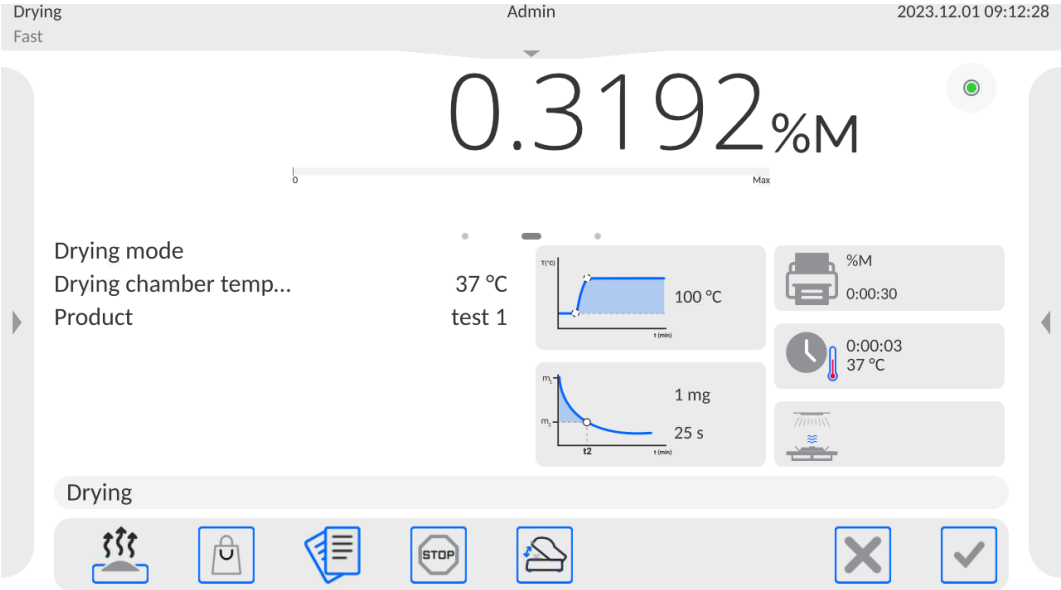


Once the result has stabilised (a pictogram will be displayed), close the drying chamber.

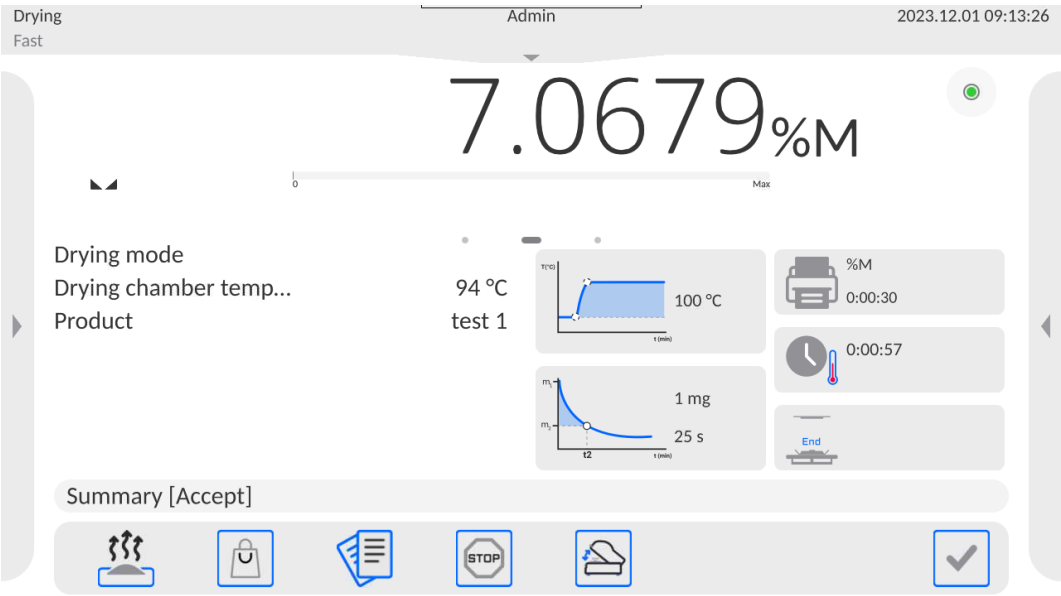


The program will initiate drying automatically. The screen will show information on testing and the moisture analyser will conduct the drying procedure in accordance preset

parameters. At the same time required mass measurements and calculations arising from the change of mass will be performed. Finally the printout header will be sent to the specific communication port (as per printout options).




While the drying procedure is going on, the screen shows current measurement results and information on the procedure (testing time, chamber temperature, etc.).
While drying, measurements are automatically sent to the communication port (as per printout options).
During the procedure, you can change the moisture unit. To do so, press the unit field and when the list of available units is ready select the one that is to be presented displayed. Once you have chosen the unit, the program will automatically calculate the value and display it in the screen.
It is possible to terminate the procedure at any time. To do so, press the STOP key.
Once the drying procedure has ended, the testing summary will be displayed and the final moisture result will be saved.
The printout footer will also be sent to the communication port (as per printout options).



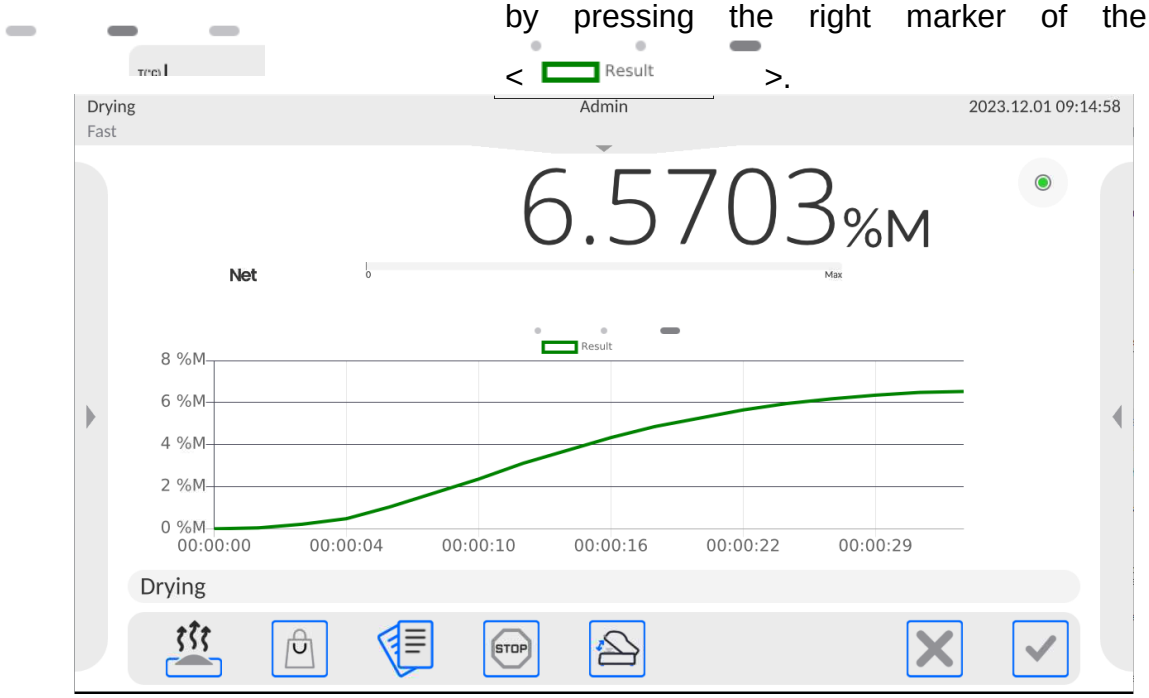
To finish the procedure, press key and the moisture analyser will show the home screen again.
After removing the dried sample from the drying chamber, you can initiate further measurements. Please remember that instant initiation of another sample drying may distort the result in view of evaporation of the sample moisture in the hot chamber before the beginning of the drying procedure. Therefore it is advisable to have a break before another measurement and make sure the drying chamber gets cold.

## 19.6. Drying diagram

You can preview the drying procedure while performing the test or after entering <Drying reports>.

### Drying diagram preview

To show the drying diagram, switch the view window by pressing the right marker of the page. < Result >.




The program will display the drying diagram together with relevant data. The diagram is drawn in real time. It allows monitoring the course of the procedure on an ongoing basis. To monitor the diagram for various units, set the moisture unit before displaying the diagram and then go to the diagram.

To return to the home screen, press the central marker of the page - < >.

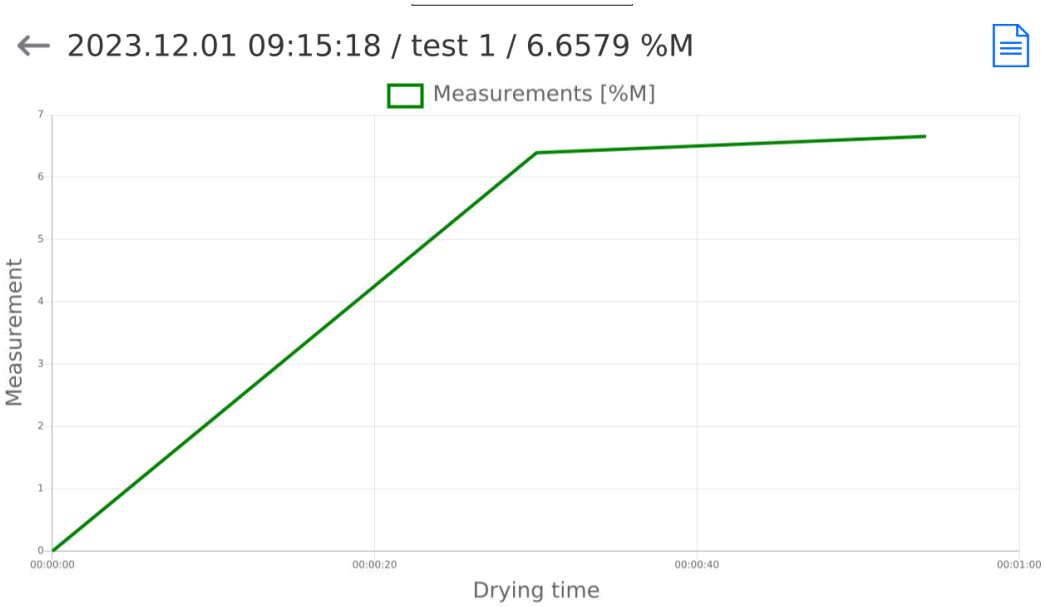
**Diagram preview in drying report base**

**Procedure:**

- Enter <Databases> submenu.
- Next press <Drying reports> field.
- Select the report that applies to the procedure by pressing its name (the name takes a form of the test date and time).
- Click <Diagram> variant.

The program will generate and display the drying diagram in the coordinate system: moisture unit/measurement.

See below for the example of the diagram view:




| | |
|---|---|
| | Save the diagram as a *.png file on the external data carrier inserted into a USB port. |

## 19.7. Result prognosis

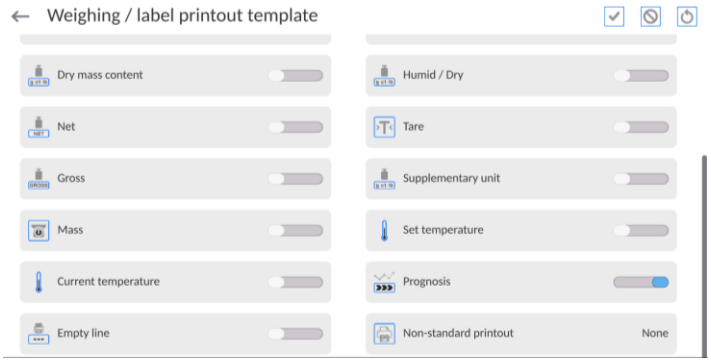
The method is concerned with forecasting a final result before the end of the drying procedure.
Based on the nature of an ongoing drying curve, created online, the moisture analyser program forecasts the final drying result.
The aforesaid result is approximate but subject to a relatively minor error (about 10% of the final result for most products and about 20% for long-drying products, that is plastics, gels and materials that contain more than 30% of water).
This method is intended for operators who aim to estimate the final result at a several-times shorter drying time. The time represents from 15% to 60% of the standard drying time.

*NOTE: while using the forecast option, it is forbidden to open the drying chamber when the drying procedure is going on because the estimation of the result (forecast) will be disturbed and the program will not be able to properly calculate the value.*
*If the program detects an open chamber, the forecast will be terminated and a relevant message will be displayed.*

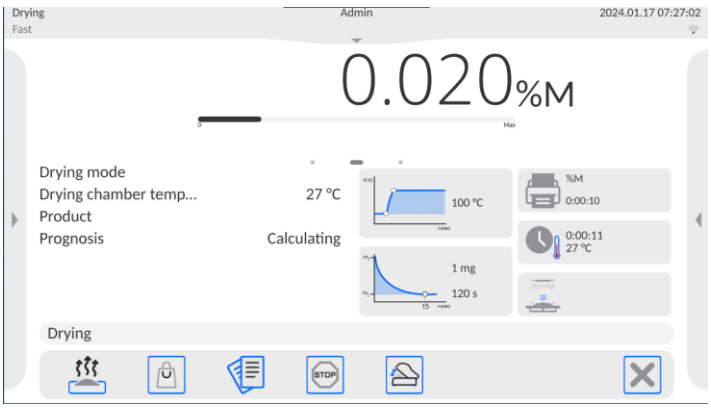
Before you initiate drying on the basis of the final drying result forecasting, set the following parameters:

1. Enable a forecast display in the home screen, in <Information> field.

2. If the forecast is to be printed out together with the measurement, activate the forecast printout in the settings: Printouts/Weighing / label printout template/ /Prognosis.




3. Once you have set the aforementioned parameters, you can start drying samples, adhering to the above-stated description. At the early stage of drying, the program is unable to calculate the final result so the <Calculating> status is displayed in the information tab.




4. After the program has found the heating curve inflexion point, the final result can be estimated. Once it has been calculated, the program will display the prognosis result in the information field.

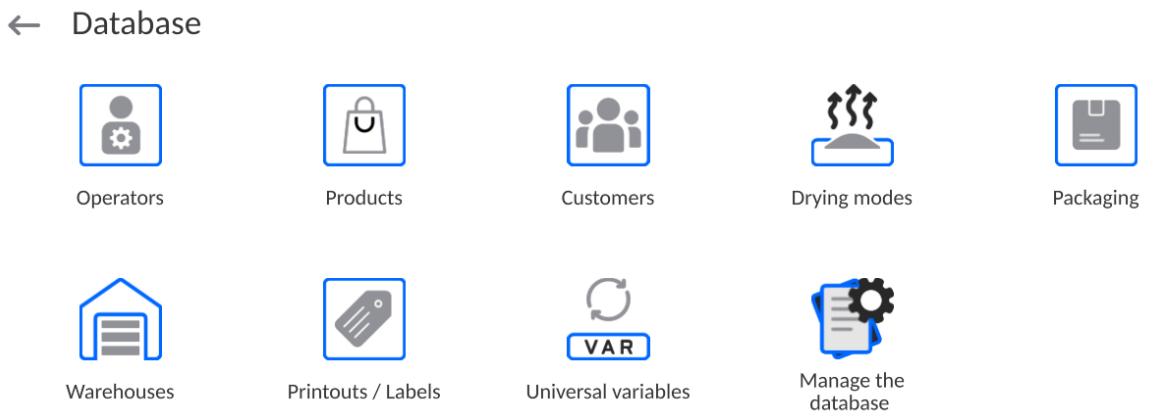
5. If the prognosis result meets the operator's expectations, he may terminate drying by pressing the button ✕ and confirm the termination in the information box.
6. When the drying procedure is finished, a drying report footer with the status and final drying result will be printed out. The footer will also contain the prognosis result that would have been obtained if the operator's termination criteria had been satisfied.

*The example of the drying report with forecast printout:*

| | |
|---|---|
| --- | |
| Start date | 2024.01.16 |
| Start time | 10:29:41 |
| Operator | Admin |
| Product | |
| Drying mode | |
| Drying profile | Standard |
| Finish mode | Automatic 5 |
| Start mass | 2.895 g |
| 0:00:10 | 0.000 %M |
| Prognosis | Calculating |
| 0:00:20 | 3.627 %M |
| Prognosis | Calculating |
| . | |
| 0:04:40 | 12.712 %M |
| Prognosis | ~13.2 %M |
| . | |
| 0:05:00 | 12.884 %M |
| Prognosis | ~13.1 %M |
| --- | |
| Status | Aborted |
| End date | 2024.01.16 |
| End time | 10:34:45 |
| Drying time | 0:05:03 |
| Operator | Admin |
| End mass | 2.521 g |
| Current result | 12.919 %M |
| Prognosis | ~13.2 %M |

# 20. DATABASES

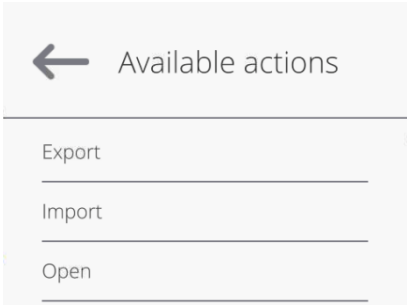
The moisture analyser software provides the following databases:




## 20.1. Operations in databases

**Operations in databases** are available only to the authorised operator.
To edit the Base, do as follows:

- Press and hold the field with base icon.
- The relevant menu will be displayed.
- Select one of the available options (available options depend on the type of the base).




Selection of options:

- EXPORT – this options allows you to export data saved in the database into the pendrive memory. Before selecting the option, insert the memory stick into any USB port. If the program can detect the memory, it will automatically initiate the copying procedure. Once the aforesaid procedure finished, a window with <Done> message will be displayed. There will also be the name of the file in which data from the base have been saved. Now you need to confirm it.
- IMPORT – this option allows you to import data from the pendrive memory. Before selecting this option, insert the memory stick into any USB port. If the program can detect the memory, you will see a window with files saved. Specify the filed with data to be imported. The selection of the file activates the copying procedure. Once the copying procedure has ended, you will see a window with <Done> message. Now you need to confirm it.
- OPEN – this option allows you to enter the specific database (similar to single click of the base field).

After entering the specific base, you can perform the following operations (depending on the type of base):

1. Add items to the database.

2. Search an item in the database by name.
3. Search an item in the database by code.
4. Search an item in the database by date.
5. Export data from the database to the USB mass memory.
6. Print information on record in the database.

The above-stated actions can be initiated through keys in the top right corner of the screen. Follow the messages displayed in the screen.

## 20.2. Operators

The menu contains a list of operators that can use the device.
The following information can be defined for each operator:

| | |
|---|---|
| Name | Code |
| Password | Full name |
| Authorisation | Active account |
| Language | Default profile |
| Card number | Fingerprint *(parameter is displayed only if you connect a fingerprint scanner)* |
| Face profile | Motif |

***NOTE: Only the Administrator-operator can add new operators or delete them from the base.***

*To add a new operator, do as follows:*

- Press <Add > key in <Operators> menu.
- Enter required fields for a newly created operator.

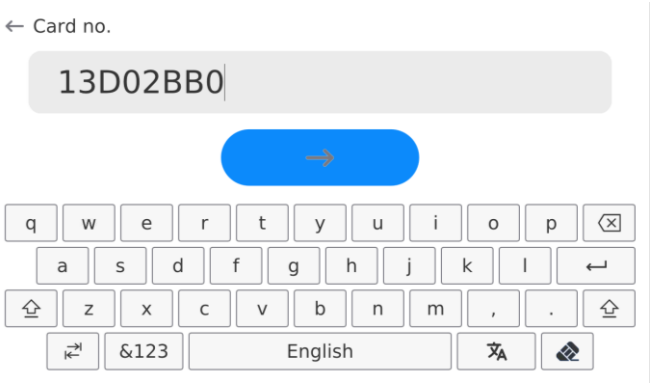
***Note:*** *You can browse through the operator base by code or operator's name.*

### How to log in via transponder card:

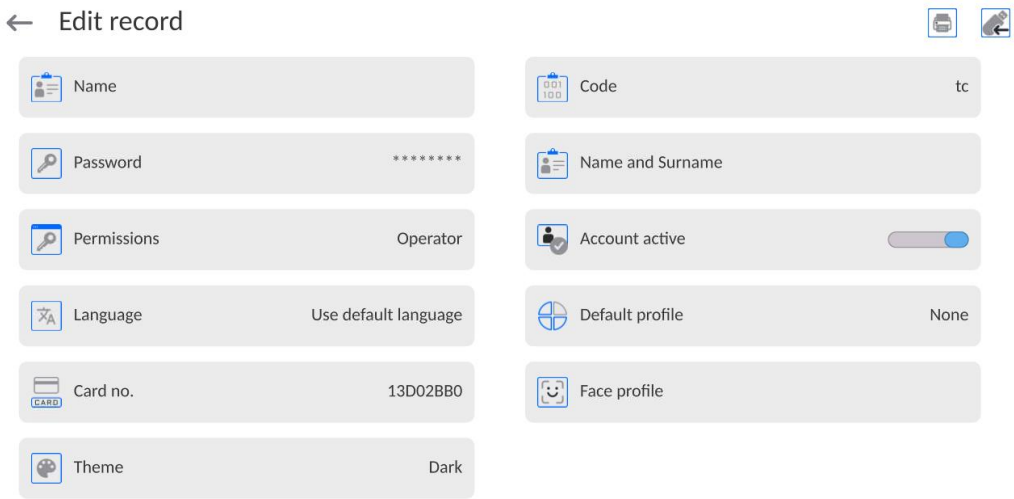
***Note:*** *A RFID reader mounted in the header operates at the frequency of 13.56MHz and complies with ISO/IEC 14443 Type A.*
*Only cards in this standard can be recognised by the reader.*

- Enter the operator's settings
- Select <Card number> variant.

- Put the card close to the RFID reader.
- The card number will be automatically entered into the edition box.




- Press key to add the card number to the operator's settings.

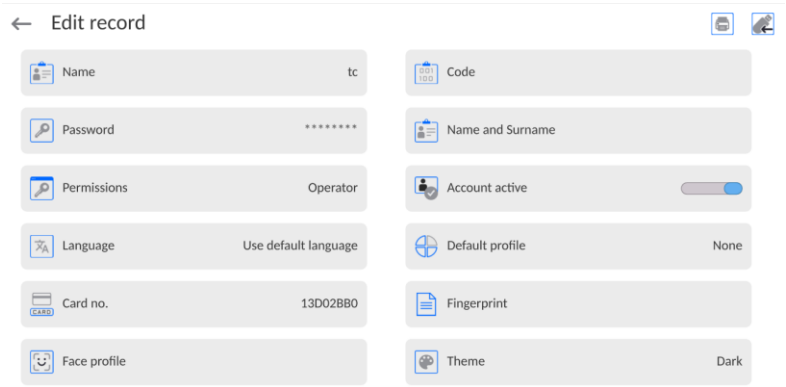



- Leave to the main menu. From now on, all you need to do is put the card close to the RFID reader to automatically log in.

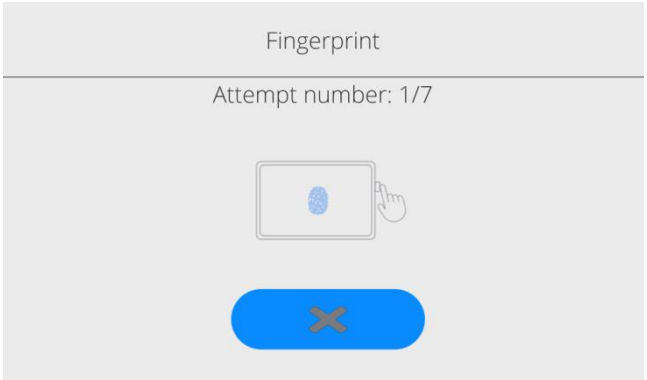
## Fingerprint login:

***Note:*** *Only the fingerprint reader that is specified as a dedicated accessory can be connected to the device. The list of accessories can be accessed on RADWAG's website.*

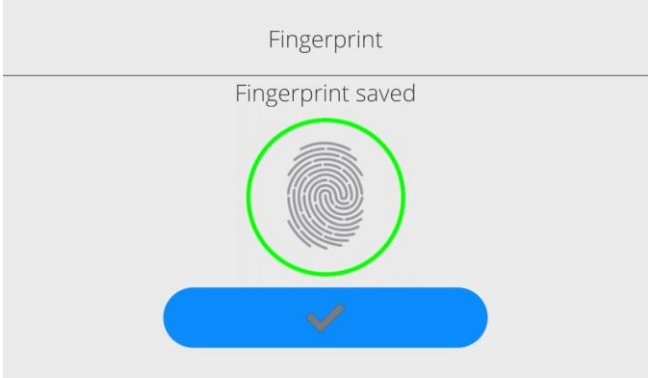
- After connecting the fingerprint reader to the USB type-A port, <Fingerprint> option will show up in the operator's settings menu.



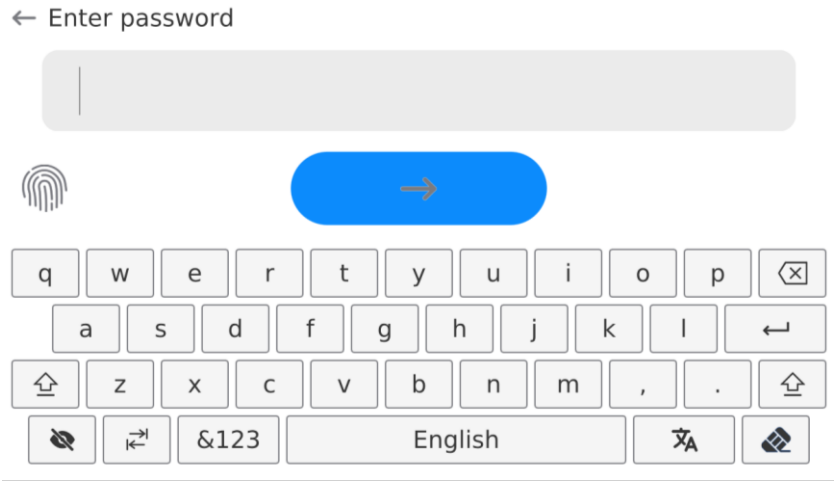

- To add a fingerprint to the operator, enter this option.




- Scan the fingerprint and repeat the procedure 7 times (as per the description in the window).
- As a result of correct completion of the procedure, the summary box will be displayed.



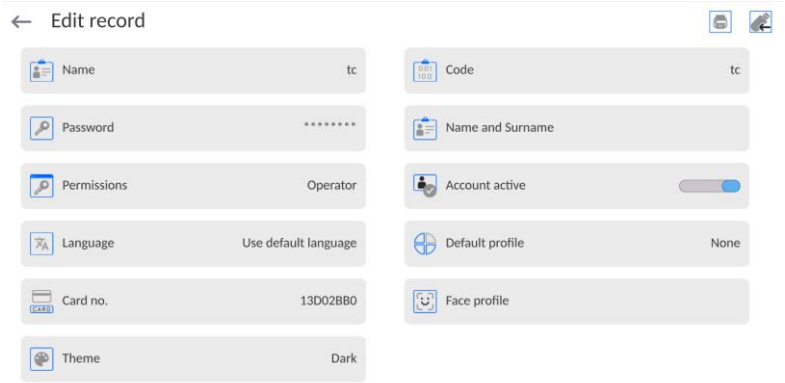

- Confirm the fingerprint assignment procedure by pressing key.
- From now on, if the fingerprint reader is connected to the USB port, the active finger login pictogram will be displayed in the login box.



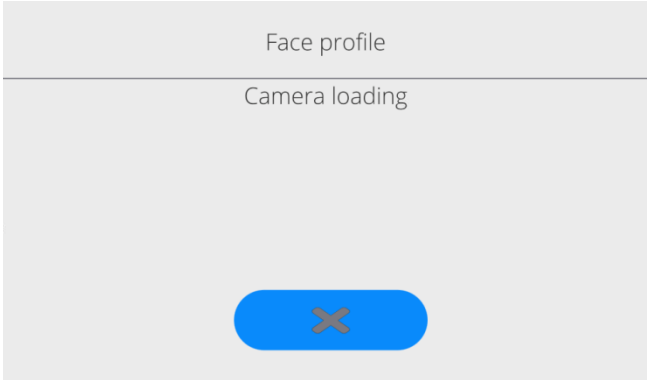

- After you put the finger close to the reader and there is match between your finger and pattern, the pictogram will turn green for a while and the operator will be logged in. The program will display the home screen of the program and the name of the logged operator will be visible in the top bar of the screen.
- If the fingerprint you scan is not compliant with the pattern, the pictogram will turn red for a while and the operator will remain unlogged and the login box will be still on.

**Face profile login:**

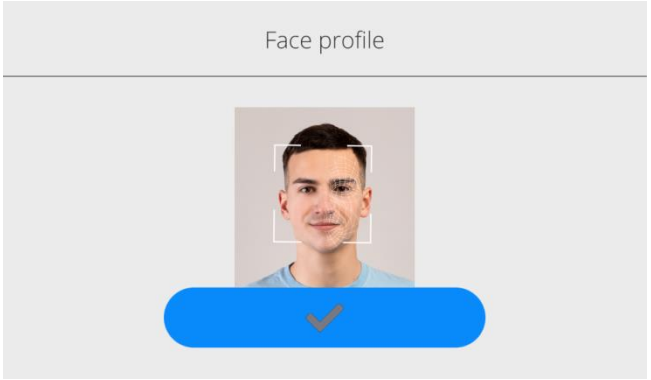
- To add a face profile for the operator, enter this option.



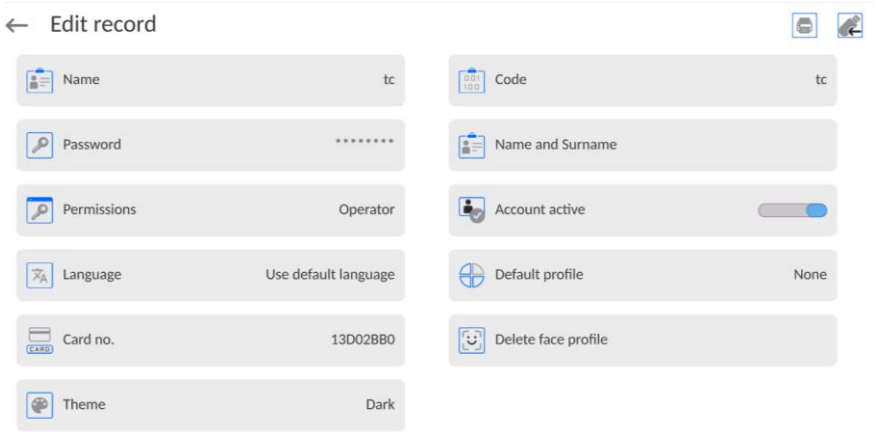

- After running the option, you will see a message and the face profile will be read. Position yourself in front of the camera properly so that the program can save the profile in the memory.



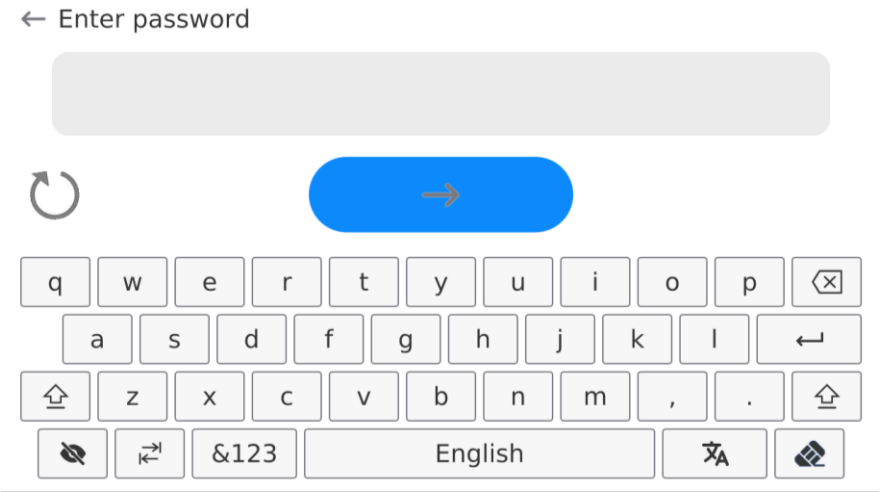

- After saving the profile, you will see the message together with the camera photo.




- Press key to close the window.
- In the operator's settings window, the description of the option will switch into <Delete face profile>, which means that the profile is saved in the memory.




- From now on, if the operator assigned the face profile tries to log in, the program will automatically read the profile in the login box, which will be communicated through a pictogram on the left side of the window.



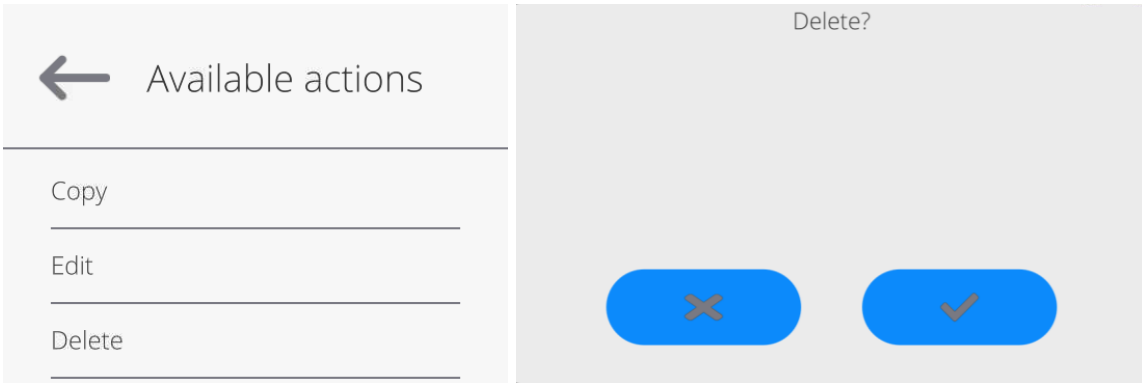

- The program automatically reads the operator's face profile photo to activate the camera (which is communicated through a glowing light next to the camera and comparison of the saved photo with the profile scanned by the camera). If these images match, the home screen of the program will be displayed. The name of the logged operator will be visible in the top bar of the screen.

**How to edit information** related to the operator:

- Press the operator's name field.
- Properties related to the operator will be displayed.
- Select and modify required data.

**To delete** the operator, do as follows:

- Press and hold the operator's name.
- The menu related to this item will be displayed.
- Select <Delete> and confirm your choice.




### 20.3. Products

The product base contains names of all items that can be weighed or dried.

**Procedure:**

- Enter <Databases> submenu and press <Products> fields.
- Press <Add> key if you want to add a new product.
- If the product already exists, press the field with the name of the product.

The list of information that is defined for the product:

| | | |
|---|---|---|
| 1. | Name | |
| 2. | Description | |
| 3. | Code | Product code |
| 4. | EAN code | |
| 5. | Mass | [product unit mass] |
| 6. | Min | [minimum start mass of the sample that can be found correct when <START MASS CONTROL – LO> option is enabled] |
| 7. | Max | [maximum start mass of the sample that can be found correct when <START MASS CONTROL – HI> option is enabled] |
| 8. | Tolerance | [% value in relation to the nominal mass(5), shows the field in which the mass can be found correct when <START MASS CONTROL> option is enabled] |
| 9. | Tare | [product tare value set automatically when selecting the product from the base] |
| 10. | Price | [product unit price] |
| 11. | Density | [product density used for compensation of air lift as the sample density] - [g/cm$^3$] |
| 12. | Number of validity days | |
| 13. | Date | [fixed product date] |
| 14. | VAT | [VAT related to the product] |
| 15. | Ingredients | [edition box for introduction of names of ingredients used to make the product, e.g. when it is a mixture or additional description concerning properties or application] |
| 16. | Printout | [printout template assigned to the product] |

## 20.4. Clients

The Clients database contains names of Recipients that measurements are made for.

**Procedure:**

- Enter <Databases> submenu and press <Clients> field.
- Press <Add> key.
- If the Client field already exists, press the name field.

The list of information that is defined for clients:

1. Client's name
2. Client's code [internal ID code]
3. NIP [*taxpayer's ID*]
4. Address
5. Postal code
6. City/town
7. Discount
8. Printout [type of printout, client-related label]

## 20.5. Drying programs

The drying program base contains drying parameters that you can use to dry products.

**Procedure:**

- Enter <Databases> submenu and press <Drying programs> field.
- Press <Add> key if you want to add a new program.
- If the program is already in the base, press the name field to edit the program.

The list of information defined for drying programs:

1. Name
2. Code
3. Drying profile
4. Termination method
5. Result
6. Printout time
7. Start mass control
8. Sample-related equipment
9. Sample preparation
10. Recommended sample size

The parameters from 8 to 10 inform the operator about additional requirements related to the specific product (e.g. a need to use the glass fibre filter, use of a specific sample mass and method of preparing the sample for drying). These descriptions are available when you press one of the quick-access keys <Sample description>, after selecting the specific drying program.

### 20.6. Minimum samples

The Minimum Samples Base contains data on declared methods and minimum samples for a specific device.

**Note:**
*Only authorised RADWAG employees have a right to enter new values of minimum samples and make changes to the already existing.*

**Procedure:**

- Enter <Databases> submenu and press <Minimum samples> field.
- Press <Add> key if you want to add a new minimum sample.
- If the minimum sample is already in the base, press the name field to enter data that can be freely edited.

**The list of information defined for minimum samples:**

1. Name – the name of method used to determine minimum samples for this device.
2. Code – method code.
3. Description – method description.
4. Next control – the validity date field for the minimum sample. 2 weeks before the date a clock pictogram will show up, next to the status icon. This information defines the validity. Contact the representative of RADWAG to make required changes to set values.
5. Thresholds – this option allows entering data on minimum sample masses and packaging mass ranges (tare) for which the specific value applies: **Tare** – maximum value of tare which the minimum sample applies to. You can enter three distinctive values: 0.000g, any mass that the device allows and maximum range (see: description in examples below). **Minimum mass –** the value of minimum mass that has been determined for the specific device in the place of using it as per relevant methods.

***Example no. 1:***

This device is assigned the following minimum sample values for the following packaging mass values:

| *Item* | *Tare value* | *Minimum sample* | *Description of action* |
|---|---|---|---|
| 1 | 0.0000 g | 0.1000 g | Minimum sample applies to all net masses that are weighed without packaging (<TARE> key is not used). |
| 2 | 10.0000 g | 1.0000 g | Minimum sample applies to all net masses that are weighed in the packaging whose weigh ranges from 0.0001 g to 10.0000 g inclusive (<TARE> key is used). |
| 3 | 50.0000 g | 2.5000 g | Minimum sample applies to all net masses that are weighed in the packaging whose weight ranges from 10.0001 g to 50.0000g inclusive (<TARE> key is used). |
| 4 | 200.0000 g | 4.0000 g | Minimum sample applies to all net masses that are weighed in the packaging whose weight ranges from 50.0001 g to 200.0000 g inclusive (<TARE> key is used). |

**Example no. 2:**

| *Item* | *Tare value* | *Minimum sample* | *Description of action* |
|---|---|---|---|
| 1 | 220.0000 g | 0.5000 g | Minimum sample applies to all net masses that are weighed in packaging of any weight corresponding to the device tolerance (<TARE> key is used), as well as in weighing samples without packaging (<TARE> key is not used). |

**Example no. 3:**

| *Item* | *Tare value* | *Minimum sample* | *Description of action* |
|---|---|---|---|
| 1 | 0.0000 g | 0.2500 g | Minimum sample applie sto all net masses that are weighed without packaging (<TARE> key is not used).<br>The program identifies such a setting in the way that the minimum sample applies only to weighing samples without packaging. If tarring option is used, the program will deactivate the icon that signals the use of minimum sample, interpreting the record as weighing with tare (minimum sample is not defined). |

It is possible to preview the data that you have entered but it is not possible to edit them.

## 20.7. Packaging

It is a list of relevant packaging that you need to assign a name, code and mass value. While weighing, after selecting the name, the tare value will be called automatically. The screen will show it with a minus sign.

**Procedure:**

- Enter <Databases> submenu and press <Packaging> field.
- Press <Add> key if you want to add a new packaging.
- If the packaging already exists, press the name field and enter packaging-related information.

***Note:*** *You can search by name or code.*

## 20.8. Warehouses

Depending on the organisation of work, Warehouses contain a list of places which the sample has been collected for weighing/drying, or places which the sample has been delivered to. For each warehouse, enter the name, code and description.
While weighing/drying, select the name of the warehouse to assign it to the result automatically.

**Procedure:**

- Enter <Databases> submenu and press <Warehouses> field.
- Press <Add> key if you want to add a new warehouse.
- If the warehouse already exists, press the name field and enter identification data.

***Note:*** *You can search by name or code.*

## 20.9. Printouts / Labels

The Printout Base contains all NON-STANDARD printouts. Each of them has its unique name, code and the so-called template.

**Procedure:**

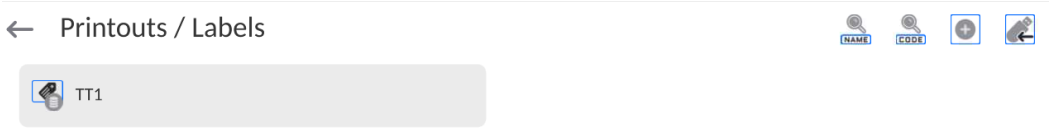
- Enter <Databases> submenu and press <Printouts> field.
- Press <Add> key if you want to add a new printout.
- If the non-standard printout already exists, press the name field and enter identification data.

***Note:*** *You can search by name or code.*

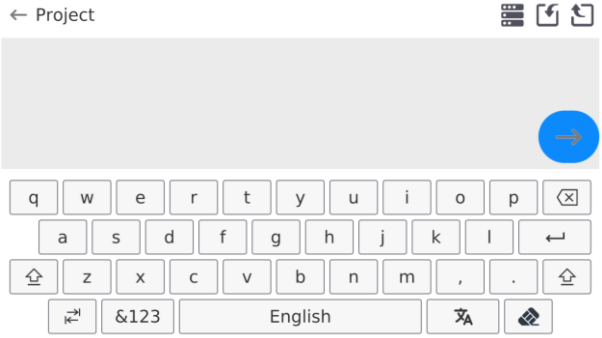
**How to design a new printout.**

**Procedure:**

- Enter <Databases> submenu and press <Printouts> field.
- Press <Add> key and create a new printout or edit the existing one.




- In <Record edition> field, press <Template> key.
- A window allowing you to create any printout will be displayed.
- While creating a printout, you can use an external USB keypad connected to the head or a touch keypad that is identical in terms of functions as the PC keyboard.




The keypad displayed does not offer some characters, such as a colon or diacritical marks typical of a specific menu language (menu language is signalled with the description on „SPACE" key). To use such marks in the printout you design, **press and hold** a specific letter on the keypad. In effect additional keys with assigned marks will be displayed. Press them to enter the text. Once you have entered the mark, disable marks by pressing „X" key.

The example of characters for Polish keypad.

| Letter on the keyboard | Additional characters | Letter on the keyboard | Additional characters | Letter on the keyboard | Additional characters |
|---|---|---|---|---|---|
| **„t"** | € t y | **„u"** | µ u i | **„a"** | ~ a s |
| **„x"** | ' ` x c | **„c"** | \ \| c v | **„v"** | [ { v b |
| **„b"** | ] } b n | **„,"** | : < = , . | **„."** | ; > . |

- Save the printout you have created.

**The example of printout 1 – use of large edition field**

*Template*

Device no. 400015
Device parameters:
Max = 220 g
d= 0.001 g

Product name:
Date: 2011.10.24
Time: 11:48:06
---
Working mode: Weighing
---
Net mass: 94.147

Measured by: Admin

*Template printout*

**The example of printout 2 – printout from file**

All printout templates can be prepared as external files that can be imported to the device. Such a file must come in *.txt or *.lb extension and contain all fixed and variable information. The content of such a file can be modified if imported.

**Procedure:**

- create a *.txt or *.lb file in any editor,
- copy the file into the external USB memory,
- insert the USB memory into the port,
- press [4] <download printout from file> key,
- the content of USB memory will be displayed in the screen,
- find the file with printout and press the name,
- the printout will be automatically copied into the edition field.

| | |
|---|---|
| ⚠ | ***You can add printouts from the external memory by importing already configured texts, using a USB port.*** |
| ⚠ | ***The name of the printout does not represent its content.*** |
| ⚠ | ***The list of variables intended for printout can be accessed in the „ATTACHMENTS 03" manual.*** |
| ⚠ | ***To see the example of creating and sending the label template to the device memory, please read „ATTACHMENTS 03" manual.*** |

## 20.10. Universal variables

Universal variables are alphanumerical information that can be linked to printouts, product or other information related to weighing. For each variable, enter the name, code and value.

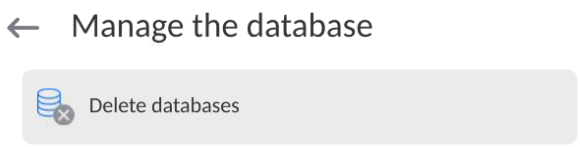
**Procedure:**

- Enter <Databases> submenu and press <Universal variables> field.
- Press <Add> key if you want to add a new variable.
- If the variable already exists, press the name field and make relevant modifications to fields: code, name, value.

***Note:*** *You can search by name or code.*

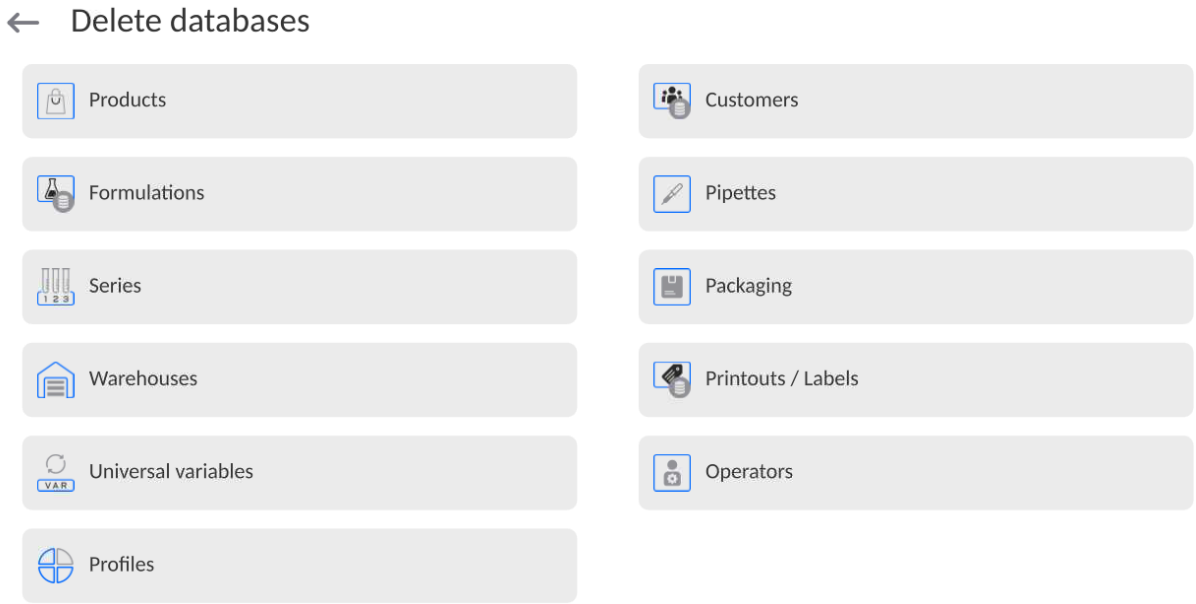
## 20.11. Database management

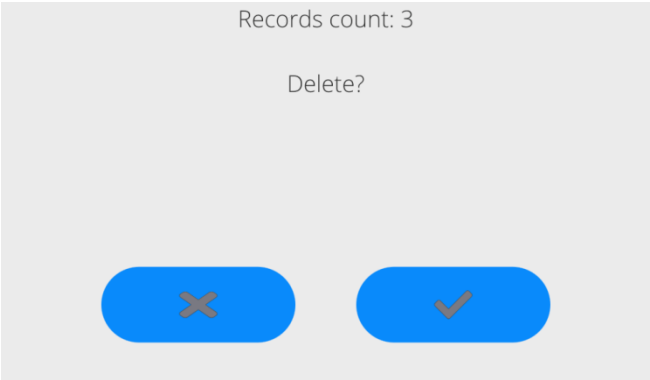
This function allows you to manage data in bases. There are three available options: Export weighing base to file, Delete databases and Delete weighing records and reports.



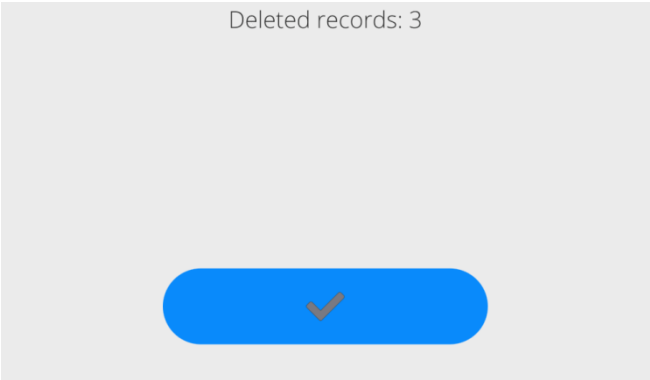

## 20.12. Delete databases

This function allows you to delete data from specific databases. After running the function, you will see a window in which you need to select the base that you want to delete data from.





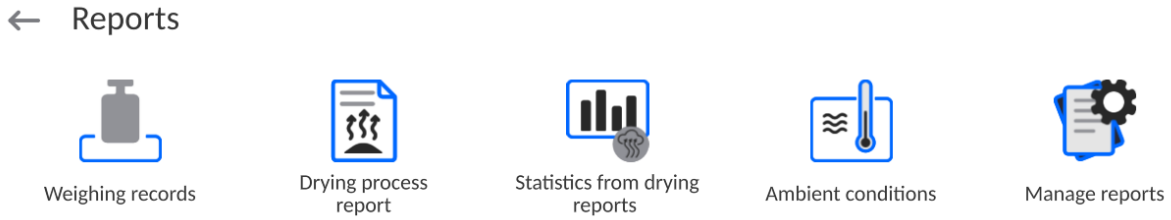

Confirm the operation to make the program delete data and display the summary box:




Confirm the information to make the program return to the previous window. You can perform further operations or return to weighing.

## 21. REPORTS

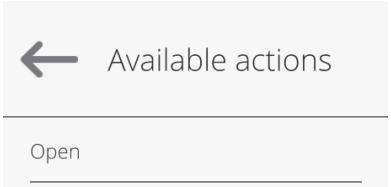
The moisture analyser software provides the following databases:




### 21.1. Operations in databases

**Operations in databases** are available only to the authorised operator.
To edit these bases, do as follows:

- Press and hold the field with base icon.
- A relevant menu will be displayed.
- Select one of the options (available options depend on the type of base you choose).



Meaning of options:

- OPEN – this option allows you to enter the specific database (the same happens when you single click the base field).

After entering the specific base, you can perform the following operations (depending on the type of base):

1. Add an item into the database.
2. Search an item in the database by name.
3. Search an item in the database by code.
4. Search an item in the database by date.
5. Export data from the database into the USB mass memory.
6. Print information on a record in the database.

The above-stated actions can be initiated through keys in the top right corner of the screen. Follow the messages displayed in the screen.

### 21.2. Weighing

Every weighing result sent from the device to the printer or computer is saved in the weighing base.
You can preview data for particular weighing records.

**Procedure:**

- Enter **<Reports>** submenu**.**
- Enter **<Weighing>** base and press the desired item.

The list of information in the database for weighing:

1. Weighing date
2. Weighing result
3. Tare value
4. Information if the measurement was stable
5. Product name
6. Operator
7. Client, business partner's name
8. Working mode name
9. Warehouse, name of source warehouse
10. Packaging, name of tare used while weighing a product.
11. Result control, information on the field which the result was in:
    MIN – below threshold (possible only when <Result control –NO>)
    OK – between thresholds
    MAX – above threshold (possible only when <Result control –NO>)
12. Platform number, field shows the number of the platform which weighing has been performed on
13. Levelling shows if the device level was maintained during the measurement
14. Environmental conditions alerts show if the temperature and humidity were stable during measurement

### 21.3. Drying reports

It contains information on drying. For each report, you can preview, search by date, export and print out.

**Procedure:**

- Enter <**Reports**> submenu and press <Drying reports> field.
- Press the field with the report you need. If the report is not visible, scroll the list of reports using navigation keys.
- The report name consists of a completion date and time: e.g. 2012.03.12 11:12:15.

  **Note***: You can search a report too.*

The list of information in the drying report**:**

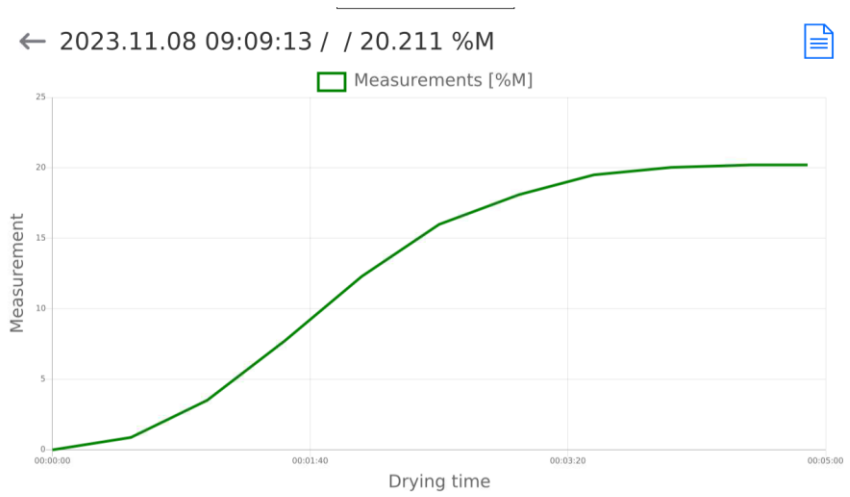
1. Start date
2. End date
3. Drying time [drying time]
4. Status [information on drying]
5. Start mass [sample start mass]
6. End mass [sample end mass]
7. Result [final drying result]
8. Measurements [particular indirect measurements saved while drying]
9. Operator [name of drying operator]
10. Product [name of dried product]
11. Drying program [name of program that drying was based on]
12. Client [business partner's name]
13. Warehouse [name of source warehouse]
14. Measurement diagram [drying details in the form of a diagram]

**Procedure:**

- Enter <Reports> submenu.
- Next press <Drying reports> field.
- Select the relevant report by clicking its name (the name takes a form of a testing date and time).
- Click <Diagram> variant.

The program generates and displays the drying diagram in the coordinate system: measurement (moisture unit)/measurement time for the specific moisture test.

The example of diagram view below:



| | |
|---|---|
| | Saving the diagram as a *.*png* file on the external USB data carrier, connected to the USB port. |

### 21.4. Drying report statistics

It allows browsing completed drying records for a specific product. For each product, you can preview reports on particular drying records, generate moisture diagrams for all drying records, print data out and export data.

**Procedure:**

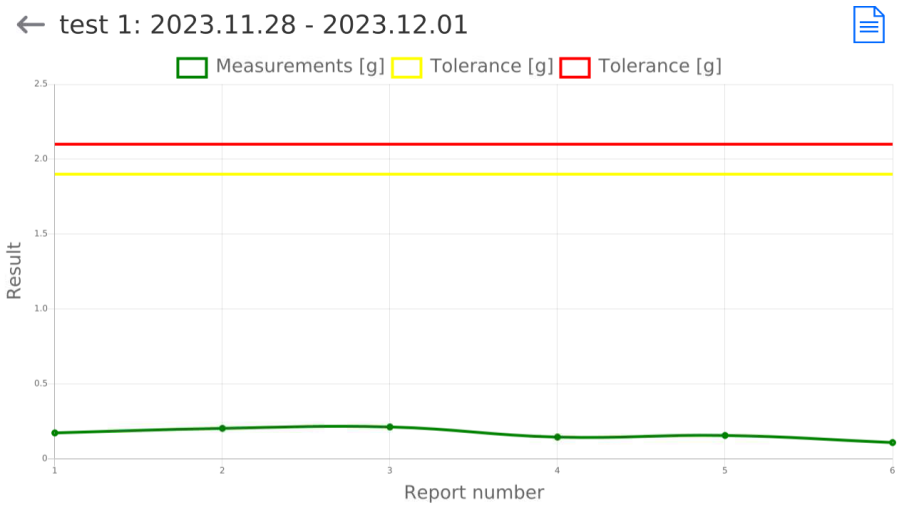
- Enter <Reports> submenu and press <Drying report statistics> field.
- Select the product which the testing history is to be generated for.
- Specify the range of data you wish to find (start date and end date).
- Display a list of drying reports that meet specific criteria (product, completion date): <Drying reports>.
- Generate the drying result diagram <Measurement diagrams>.

**To generate the measurement diagram:**

- Enter <Reports> submenu.
- Next press <Drying report statistics> field.
- Select the product which you wish to generate the testing history for.
- Specify the range of data that you want to find (start date and end date).
- Click <Measurement diagram> variant.

The program will generate and display the product drying result diagram in the coordinate system: Result/Measurement number.

The example of diagram view below:




| | |
|---|---|
| | Saving the diagram as a *.*png* file on the external data carrier, connected to the USB port. |

## 21.5. Environmental conditions

It contains information related to environmental parameters. Depending on the configuration, such a list may include temperature, humidity, atmospheric pressure. When a THB environmental module is connected to the device, information on readout will be recorded too.

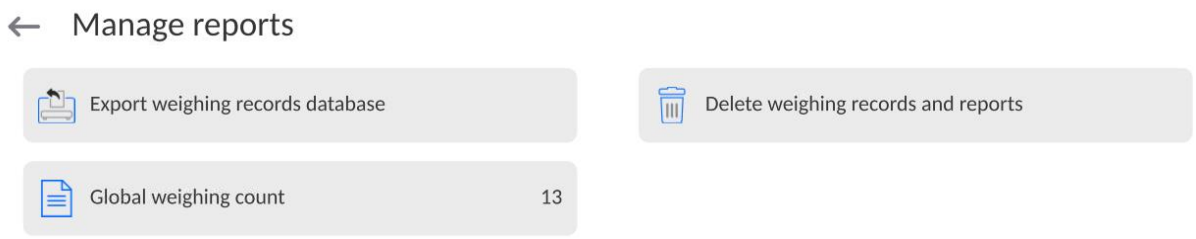
**Procedure:**

- Enter <Reports> submenu and press <Environmental conditions> field.
- Press the field with the report you need. If the report is not visible, scroll the list of reports using navigation keys.
- The name of the record with data consists of the date and time.

***Note:*** *You can search data by date.*

## 21.6. Report management

This function allows you to manage data included in report bases. There are three available options: Export weighing base to file, Delete databases, and Delete weighing records and reports.

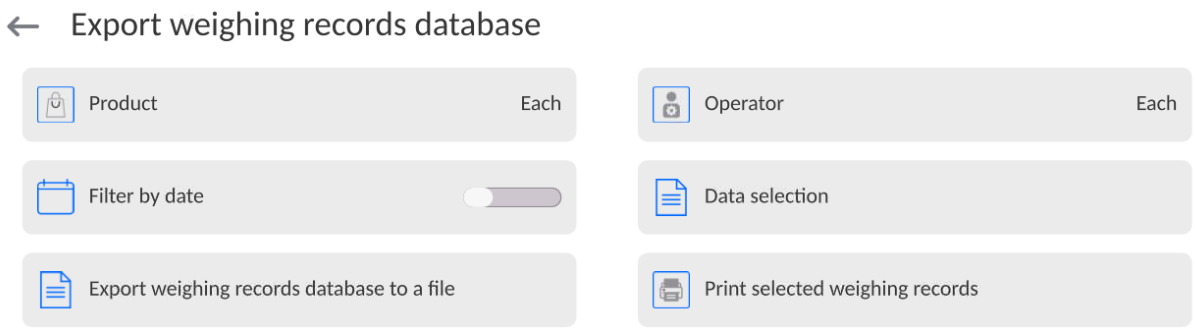



### 21.6.1. Export weighing database to file

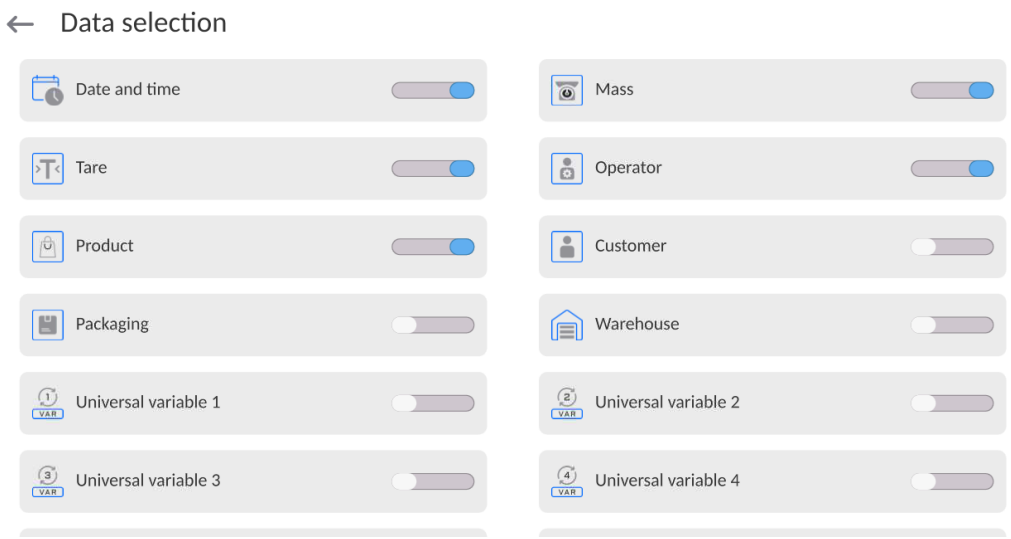
All weighing records are saved in the Weighing database. This information can be exported to the file with the use of the pendrive mass memory device.

**Procedure:**

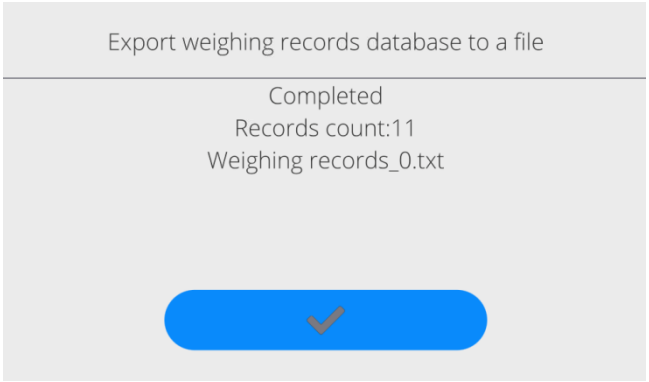
- Connect the pendrive mass memory device to the USB port.
- Press <Export weighing database to file> field and the program will display another window in which you need to set export options.




In <Data selection> variant, you can define measurement-related data that are to be exported.




- After setting the option, click <Export Weighing database to file> field and the program will start exporting the weighing database automatically.
- When exporting is completed, you will see <**Done>** message and information on the number of exported data and file name (with *.txt extension). Then the previous window will be displayed again.




- You can return to weighing or go to further menu settings.

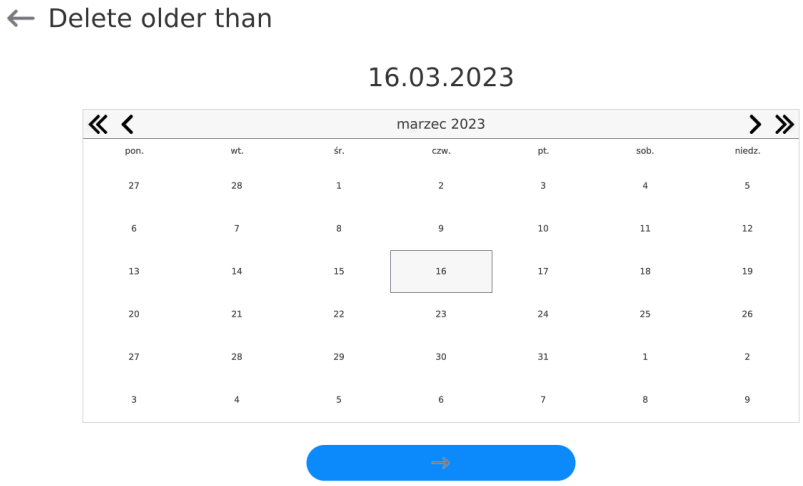
***Note:*** *If the pendrive mass memory device cannot be recognised, when you enter <Export weighing database to file> field, you will see the message: <Operation error>.*

- The name of the file consists of the database name and device factory number, e.g. <Weighing_364080.txt>.
- Disconnect the pendrive mass memory device from USB port.

**File template:**
The file template takes a form of a table whose columns are separated with <Tab> mark to export the file to the <Excel> sheet directly. The table contains all information on weighing, that is date and time, mass and mass unit, tare and tare unit, series number, operator's name, business partner's name, packaging name, source warehouse name, target warehouse name, control result name.

### 21.6.2. Delete weighing records and reports

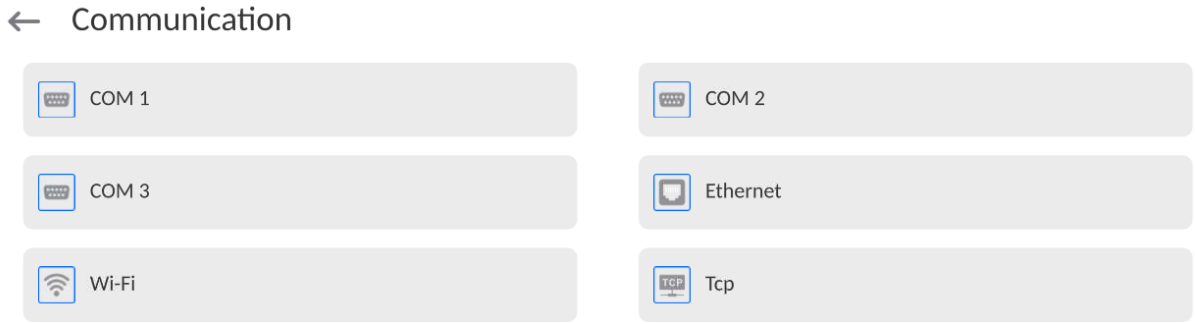
This field is used to clear the database of weighing records and reports. Activate this function to make the program display a numerical keypad box in which you need to enter the limit date. The date specifies the limit for data deletion – older than the date you enter. Specify the year, month and day.




Confirm the date to cause all weighing records and reports collected at the specific time to be deleted. The quantity of deleted data will be displayed.

# 22. COMMUNICATION

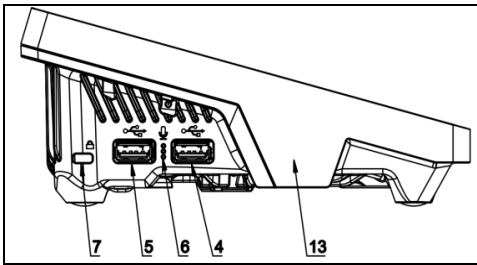
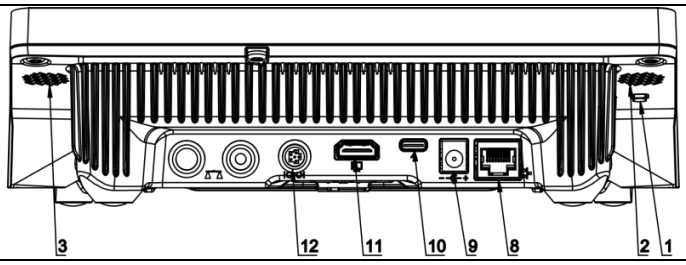
The Communication menu can be accessed in the Parameters menu. To gain access to the menu, press <Setup> key or icon.
It is possible to communicate with the external device via the following ports:




The parameters of each port can be configured as per individual needs.
The weighing indicator allows connecting the IM02 communication module. In its standard variant, the IM02 communication module extends the range of interfaces to include RS 232 IM02, Virtual COM, 4WE/4WY.

## 22.1. RS 232 port settings

*NOTE: to assure a correct cooperation with external devices (peripherals) via RS 232 ports, use a USB-to-RS232 converter.*

| | |
|---|---|
|   | 4 – USB type-A port is detected by the program as RS 232 – COM1 port after connecting the converter<br><br>5 – USB type-A port is detected by the program as RS 232 – COM2 port after connecting the converter |
|   | 12 – RS 232 – COM3 port |

**Procedure:**

- Select the communication port: <COM1>, <COM2> or <COM3>.
- Set suitable values.

For RS 232 port settings, the program offers the following transmission parameters:

- Transmission speed: 4800, 9600, 19200, 38400, 57600, 115200 bit/s, *921600 bit/s**
- Data bits: 5, 6, 7, 8
- Stop bits: None, 1, 1.5, 2
- Parity: None, Odd, Even, Marker, Space

**) - The speed of 921600 bit/s applies only to the COM3 port and cooperation with MediaBox IM02 communication module.*

## 22.2. ETHERNET port settings

**Procedure:**

– Select <Ethernet> communication port and then set relevant values:

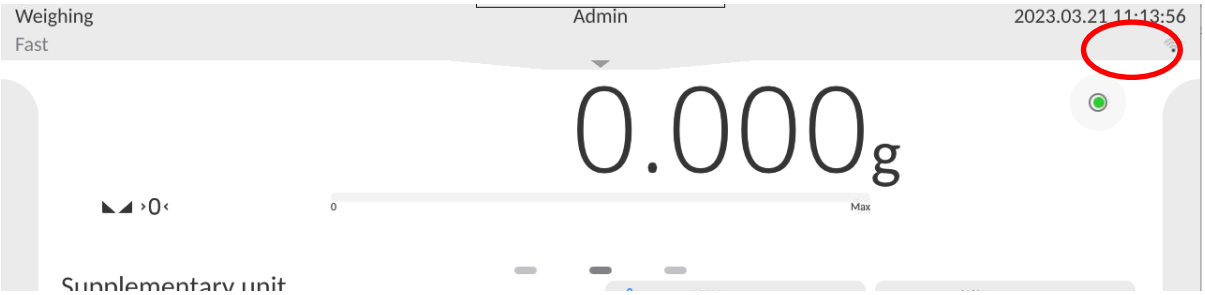
- DHCP: Yes – No
- IP address: 192.168.0.2
- Subnetwork mask: 255.255.255.0
- Default gateway: 192.168.0.1

***Note:*** *The above-stated settings are for reference only. Transmission parameters must be adapted to client's local network settings.*

After you have made changes, press key and you will see the following message:
*<To make changes effective, restart the device>.*
Return to weighing and restart the device.

## 22.3. Wi-Fi port settings

If the device is equipped with a Wi-Fi module, a special icon will be visible in the top bar of the home screen:




**Procedure:**

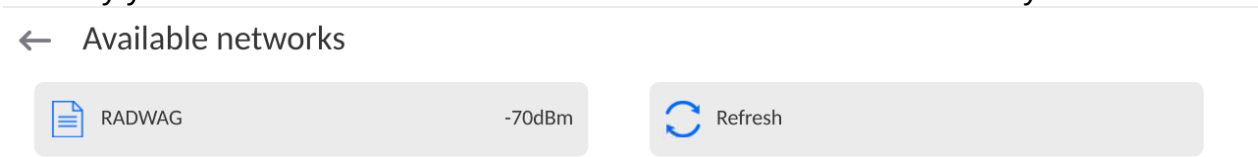
– Select <Wifi> communication port and then set relevant values:

- DHCP: Yes – No
- IP address: 10.10.9.155
- Subnetwork mask: 255.255.255.0
- Default gateway: 10.10.8.244

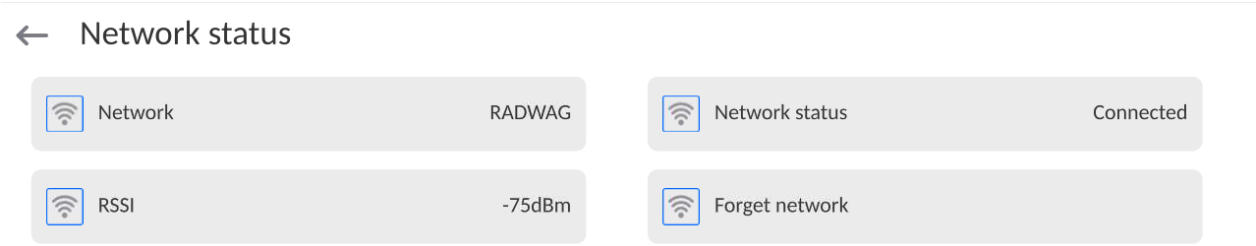
***Note:*** *The above-stated settings are for reference only. Transmission parameters must be adapted to client's local network settings.*

After you have made changes, press key and you will see the following message:
*<To make changes effective, restart the device>.*
Return to weighing and restart the device.

Additionally you can check <Available networks> that have been detected by the device:




The icon next to the network name tells you if the network requires password (lock icon). To find available networks, press <Refresh> key.
To check parameters of the specific network, press <Network status> field and the specific network parameters will be displayed in the screen:




The selected network and connection parameters are remembered by the program. Every time you activate the device, the program connects to the network as per the preset parameters. To disable this property, select <Forget network> variant. This will result in termination of the connection to the network.

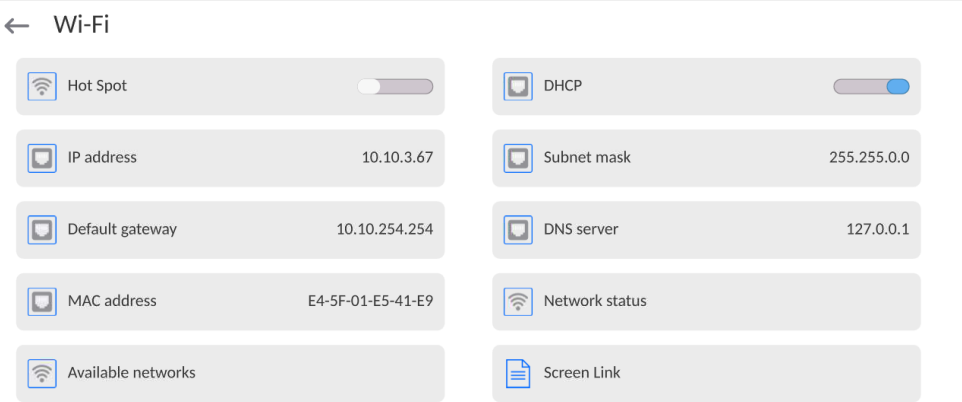
### 22.3.1. General information on Hot Spot service

Hot Spot – an open access point that allows wireless connection to the device by means of other equipment, e.g. laptop, tablet or mobile phone, using the Wi-Fi wireless network.

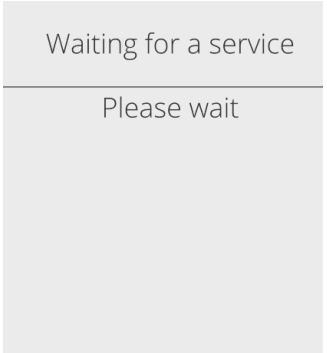
The Hot Spot holder decides how, to whom and on what terms he can share the connection via logging that requires a unique user name and password (these data are assigned while activating the service and stored in the memory).

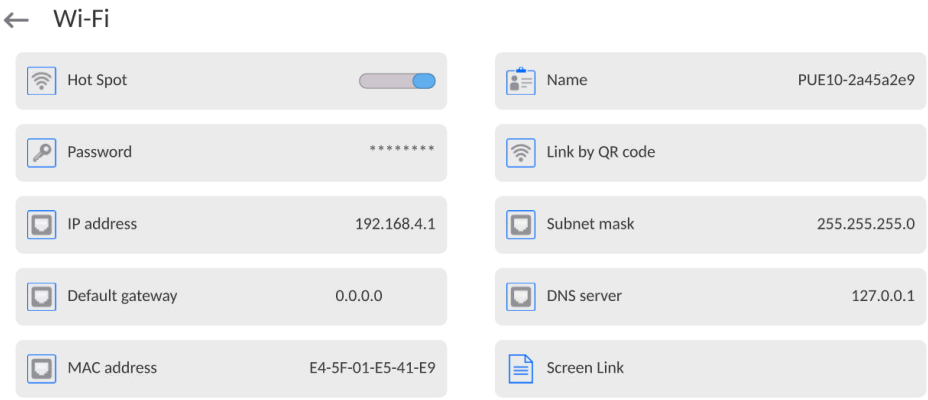
### 22.3.2. Activation of Hot Spot service

1. Enter Wi-Fi options

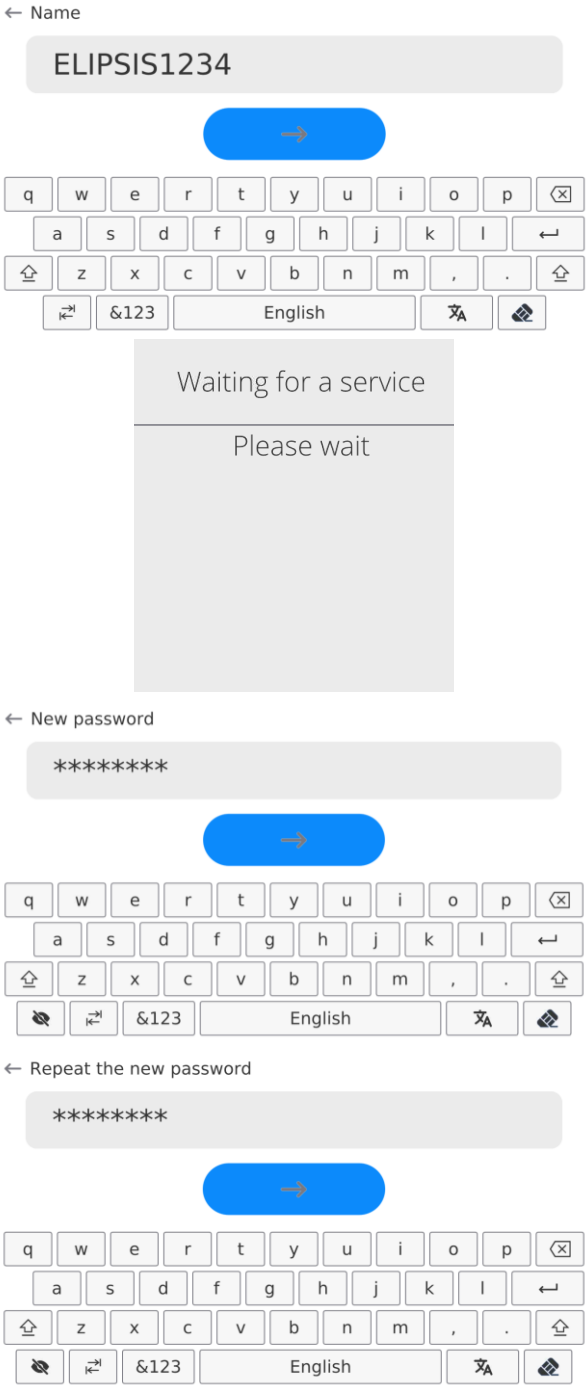


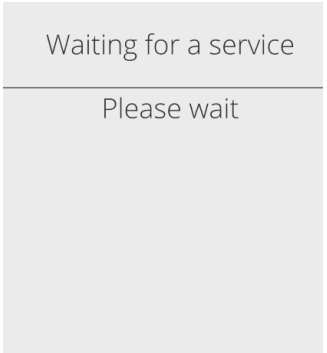

2. Activate the Hot Spot service and the device will go to the settings.

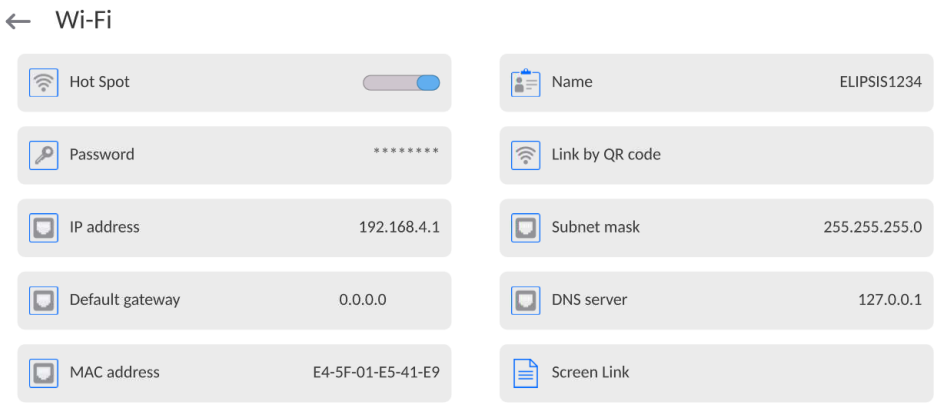





3. Enter a unique name and password (the password must be at least 8 characters long).






4. From now on, the Hot Spot service will remain active and a new subnetwork will be detected by other smartphones. It will be possible to connect to it through the password.

## 22.4. TCP protocol settings

TCP (*Transmission Control Protocol)* is a streaming communication protocol that operates between two computers. TCP is based on the client-server mode. The server awaits connection in the specific port while the client initiates the server connection.

**How to set the port number for TCP:**

- Enter <Communication> parameters group.
- Select <Tcp / Port> to see a <Port> window with an on-screen keypad.
- Enter the desired port number and press → key to confirm.

## 22.5. Virtual COM port settings

*Applies to the active IM02 communication module*

The Virtual COM port is used to connect the device to the computer.

**The sequence of actions:**

1. In <Devices / Computer / Port> submenu, set the Virtual COM value.
2. Run a computer software used to read measurements from the balance.
3. Set communication parameters in the computer software, i.e. COM port, transmission parameters.
4. Start cooperation.

# 23. PERIPHERALS

The DEVICES menu contains Parameters menu. To gain access to this menu, press <Setup> icon. The menu will include a list of equipment that can cooperate with the moisture analyser.

## 23.1. Computer

The active connection of **moisture analyser – computer** is signalled through icon in the top bar of the home screen.

### 23.1.1. Computer port

The moisture analyser can communicate with the computer via the following ports: COM 1, COM 2, Tcp, USB Free Link*, RS 232 IM02**, Virtual COM**.

**Procedure:**

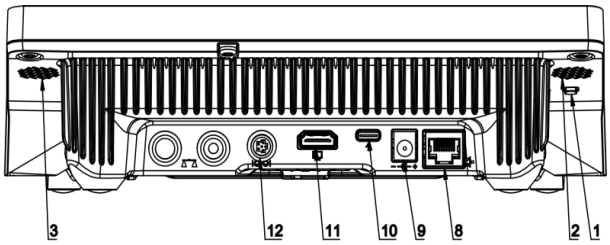
- Enter **<Devices / Computer / Port>** submenu and select the desired port from the list.

*) – The description of the port can be found in the COMMUNICATION section of the manual.
****)** - The IM02 communication module port connected to the device.

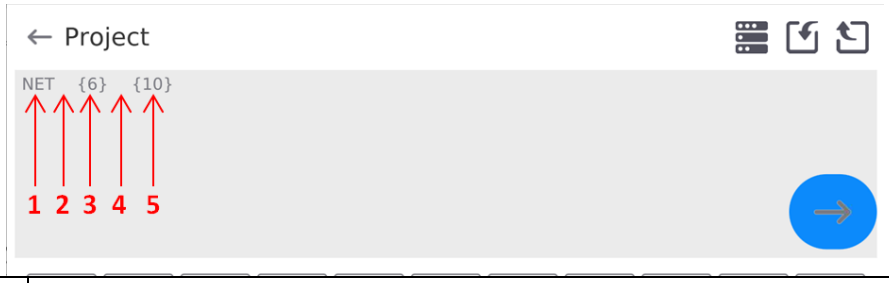
### 23.1.2. USB Free Link

It is a tool used to enter data for peripherals as a keypad. Thanks to this, when you modify the standard or non-standard printout and send a suitable command from the computer or press ENTER key in the keypad, the data included in the non-standard printout will be directly sent from the device to such computer programs as Excel, Word, Notebook, etc.
To assure a suitable cooperation with Excel, configure the non-standard printout by entering the formatting characters to the printout you design, for example Tab, Enter key and diacritical marks typical of language. Please remember to set a proper decimal separator (dot or comma) that will be accepted by our Excel program (see submenu: **< / Miscellaneous / Decimal separator>**).

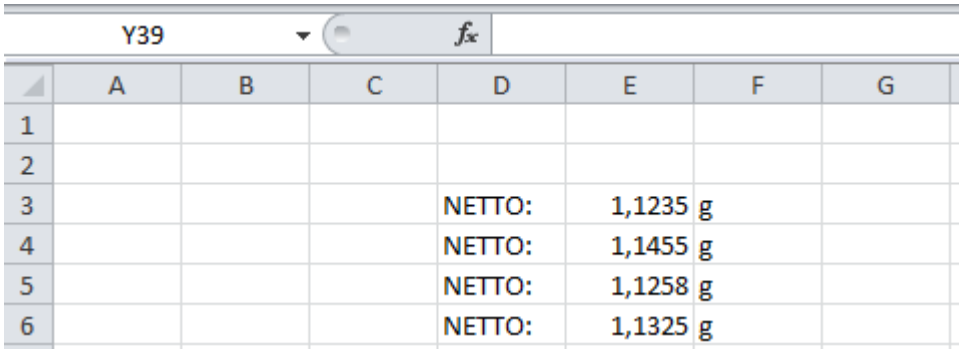
**USB Free Link** is a USB type-C port (port no. 10 at the back of the readout head) that the computer is connected to via a USB type A/C cable.




The example of the printout template and final printout in Excel:




| | |
|---|---|
| 1 | fixed text |
| 2 | tabulator (switch to next column) |
| 3 | variable {6}, net mass in adjustment unit |
| 4 | tabulator (switch to next column) |
| 5 | variable {10}, mass unit |



| | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| 1 | | | | | | | |
| 2 | | | | | | | |
| 3 | | | | NETTO: | 1,1235 | g | |
| 4 | | | | NETTO: | 1,1455 | g | |
| 5 | | | | NETTO: | 1,1258 | g | |
| 6 | | | | NETTO: | 1,1325 | g | |

### 23.1.3. Computer address

It allows setting the address of the device that a computer is connected to.

**Procedure:**

- Enter **<Devices / Computer / Address>** submenu and you will see **<Address>** window with an on-screen keypad.
- Enter the desired address and press key to confirm changes.

### 23.1.4. Continuous transmission

Activation of balance-computer permanent transmission. After enabling <**Permanent transmission>** parameter, the content of **<Weighing Printout Template>** is continuously sent to the PC.

**Procedure:**

- Enter **<Devices / Computer / Permanent transmission>** submenu and set relevant value ( - Permanent transmission disabled; - Permanent transmission enabled).

### 23.1.5. Interval

Here you can set frequency of **<Weighing Printout Template>** printout for continuous transmission. The frequency of printout can be set in seconds, with an accuracy of 0.1s., in the range from 0.1s to 1000 seconds.

**Procedure:**

- Enter **<Devices / Computer / Interval>** submenu and the **<Interval>** edition box will be displayed.
- Enter the desired value and press key to confirm changes.

### 23.1.6. Weighing printout template

The unique template of printout from the device to computer.

**Procedure:**

- Enter **<Devices / Computer** / **Weighing Printout Template>** submenu and you will see **<Weighing Printout Template>** edition box with an on-screen keypad.
- Modify the template as desired and press key to confirm changes.

### 23.1.7. Cooperation with E2R System

Activation of cooperation with **E2R System** computer program. **E2R System** is a module system that handles production processed related to weighing procedures at various stages.

| | |
|---|---|
| ⚠ | ***Only the operator with <Administrator> permission is authorised to activate <E2R> parameter. In case of cooperation with <E2R System>, database edition in the device is blocked.*** |

Access path: **< / Devices / Computer / E2R System>**.

**The list of options in <E2R System> submenu:**

| | |
|---|---|
| **Active system** | Activation of connection to **E2R System**: - connection disabled, - connection enabled. If the connection is enabled, the icon in the top bar of the home screen will be visible. |
| **Block product selection** | Activation of product selection lock for balance operator: - lock disabled, - lock enabled. |
| **Databases** | Submenu with configuration of databases that cooperate with E2R System. |
| **Info** | List of database events that occur during active connection to E2R System. |

## 23.2. Printer

In <Printer> submenu, the operator can:

- set the printer communication port: COM 1, COM 2, USB, Tcp Client, USB Free Link*, RS 232 IM02**,
- define the printout code page (by default: 1250),
- define control codes for the printer that supports PCL (*Printer Command Language*) or receipt printer.
- define printout templates.

***)** – Description of the port is analogical to description of the computer port.
****)** - IM02 communication module port connected to the device.

To make sure the device cooperates with the printer properly (proper printout of letters with diacritical marks for a specific interface language), select a suitable speed of transmission – the one that applies to the printer (see: Printer settings) and assure compliance of the code page of the printout with the code page of the printer.

The compliance of the code page can be obtained in two ways:

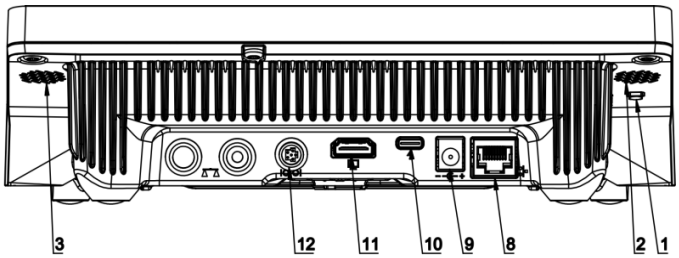
- by setting the suitable code page in the printer settings (see: printer manual) – the same as in the printout code page in the device,

| Code page | Language |
|---|---|
| **1250** | Polish, Czech, Hungarian. |
| **1252** | English, German, Spanish, French, Italian. |
| **1254** | Turkish. |

- by sending a control code that sets the suitable code page of the printer before printout (the same as printout code page) before printing data from the moisture analyser (only when the device features such an option).

| | |
|---|---|
| ⚠ | ***The default code page of the printer is 1250 – Central European code page.*** |
| ⚠ | ***A detailed description of communication with the receipt printer can be accessed in „ATTACHMENTS 03" manual.*** |

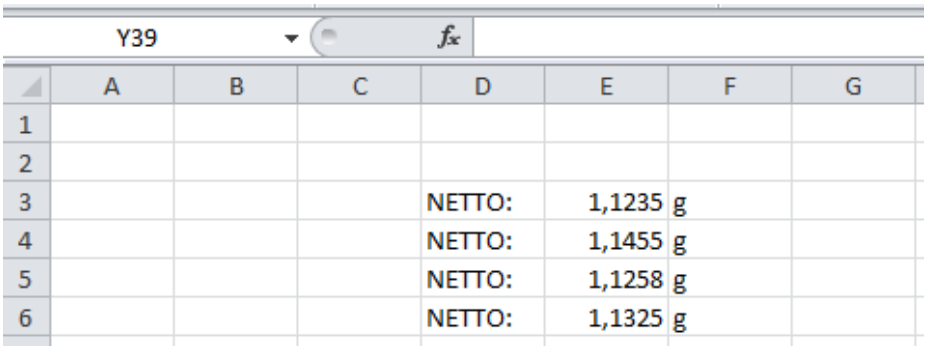
**USB FREE LINK** – USB type-C port (port no. 10 at the back of the readout head) which the computer is connected to via a USB type A/type C cable.




The tool used to enter data for peripherals as a keypad. Thanks to this, when you modify the standard or non-standard printout and send a suitable command from the computer or press ENTER key in the keypad, the data included in the non-standard printout will be directly sent from the device to such computer programs as Excel, Word, Notebook and other.
To assure a suitable cooperation with Excel, configure the non-standard printout by entering the formatting characters to the printout you design, for example Tab, Enter key and diacritical marks typical of language. Please remember to set a proper decimal separator (dot or comma) that will be accepted by our Excel program.
You can do so in: *Setup/Miscellaneous/Decimal separator*.

See below for the example of printout template and final printout in Excel:

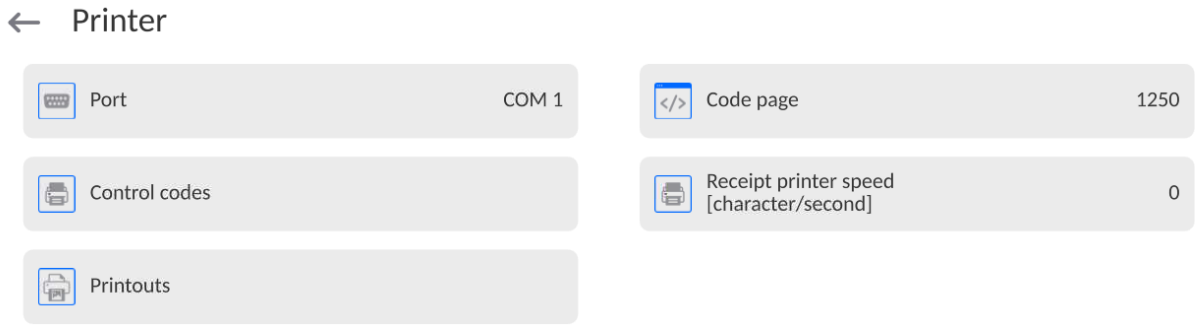
| | |
|---|---|
| 1 | fixed text |
| 2 | tabulator (switch to next column) |
| 3 | variable {6}, net mass in adjustment unit |
| 4 | tabulator (switch to next column) |
| 5 | variable {10}, mass unit |



Y39

| | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| 1 | | | | | | | |
| 2 | | | | | | | |
| 3 | | | | NETTO: | 1,1235 | g | |
| 4 | | | | NETTO: | 1,1455 | g | |
| 5 | | | | NETTO: | 1,1258 | g | |
| 6 | | | | NETTO: | 1,1325 | g | |

| | |
|---|---|
| ⚠ | ***If big data are to be printed out with the use of Free Link, set 15 in <Receipt printer speed [characters/second]> parameter.*** |




The printout template describes how the information is to be printed out from the database. If it is insufficient, modify it. Correctness of the designed template can be checked by printing product-related parameters. This operation is feasible when you go to <Products/Product edition> database – press the printer icon to do so.

Default values for particular templates:

Product Printout Template:

{50}
{51}

Operator Printout Template:

{75}
{76}

Client Printout Template:

{85}
{86}

Warehouse Printout Template:

{130}
{131}

Packaging Printout Template:

{80}
{81}
{82}

Environmental conditions printout template:

{275}
IS T1: {278} $^{o}$C
IS T2: {279} $^{o}$C
THB T: {276} $^{o}$C
THB H: {277} %

### 23.3. Barcode scanner

The moisture analyser can cooperate with the barcode scanner. The scanner can be used to quickly search for the following:

- Products,
- Operators,
- Clients,
- Packaging,
- Warehouses,
- Formulas,
- Pipettes,
- Series in differential weighing,
- Universal variables.

| | |
|---|---|
| ⚠ | ***In <Communication> submenu, set the transmission speed so that it complies with the barcode scanner (by default – 9600b/s). A detailed description of communication with barcode scanners can be accessed in the „ATTACHMENTS 03" manual.*** |

To configure the barcode scanner, go to the following submenu:
**„Setup / Devices / Barcode Scanner"**.

### 23.3.1. Barcode scanner port

**Procedure:**

- Enter **<Devices>** parameters group and select **„Barcode Scanner / Port”,** and then set the relevant option.

The moisture analyser can communicate with the scanner through the port: USB

### 23.3.2. Prefix / Suffix

You can edit **<Prefix>** value and **<Suffix>** value in order to synchronise the weighing program with the barcode scanner.

***Note:*** *In the standard adopted by RADWAG, the prefix is 01 hexadecimally (byte) and suffix is 0D hexadecimally (byte). A detailed description of communication with barcode scanners can be accessed in* ***ATTACHMENT E*** *of the manual.*

**Procedure:**

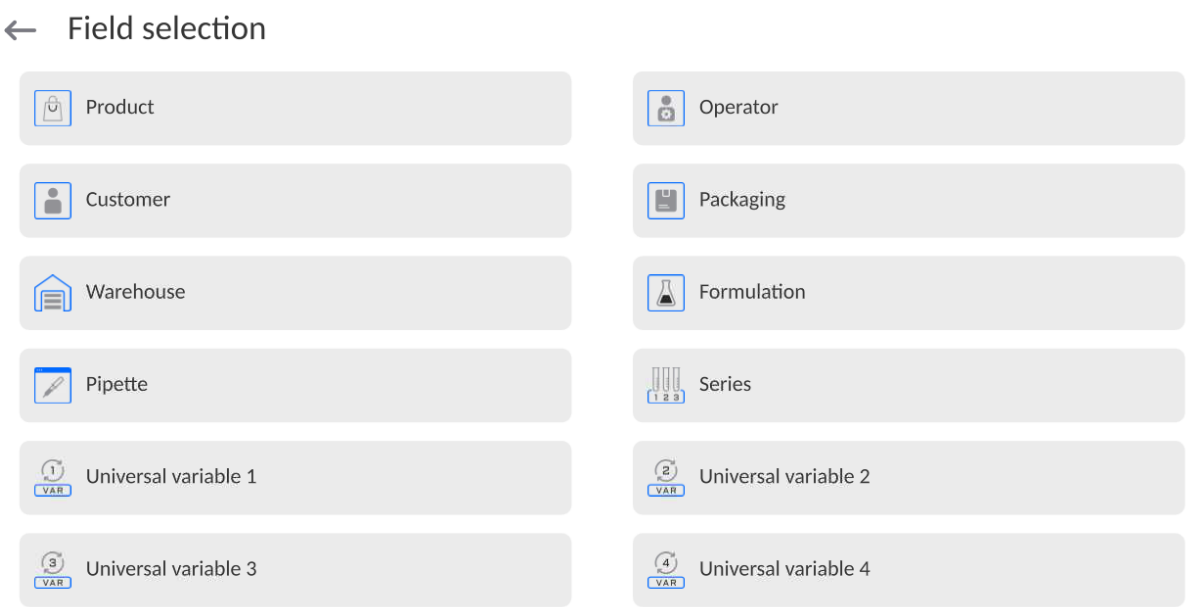
- Enter **<Barcode Scanner>** submenu,
- Go to **<Prefix>** parameter and using the on-screen keypad enter the desired value (hexadecimally) and press → to confirm changes.
- Go to **<Suffix>** parameter and using the on-screen keypad enter the desired value (hexadecimally) and press → to confirm changes.

### 23.3.3. Field selection

You can configure the field selection in particular databases.

**Procedure:**

- Enter **<Devices>** parameters group,
- Select **„Barcode Scanner / Field selection”** to display the following list:




- Enter the desired item to edit the following parameters:

| | |
|---|---|
| **Filtering** | Declare the item which searching is to be based on (see table below) |
| **Offset** | Set the first significant code mark which the search will start from. All preceding marks are skipped.<br>*For example 0 means that it starts reading from 1 code mark (significant) or 4 means that it starts reading from 5 code mark (significant).* |
| **Code Length** | Set the number of code marks that are taken into account when searching |
| **Start Marker** | Declare the beginning of the code that will be considered when searching |
| **End Marker** | Declare the end of the code that will be considered when searching |
| **Skip Marker** | Declare if start and end markers of the code are to be considered or skipped when comparing the scanned code and the code in the moisture analyser. |

The list of filtering items, depending on the field selection:

| **Field selection** | **Filtering** |
|---|---|
| Product | None, Name, Code, EAN code, |
| Operator | None, Name, Code |
| Client | None, Name, Code |
| Packaging | None, Name, Code |
| Warehouse | None, Name, Code |
| Formula | None, Name, Code |
| Pipette | None, Name, Code |
| Series | None, Name, Code |
| Universal variables | None, Active |

### 23.3.4. Test

Using **<Test>** function, it is possible to check correct operation of the barcode scanner connected to the moisture analyser.

**Procedure:**

- Enter **<Barcode Scanner>** submenu,
- Enter **<Test>** parameter to open **<Test>** window with ASCII and HEX fields,
- Scan the code to make it enter ASCII and HEX fields. The test result will be displayed in the lower part of the screen.

**When:**

- **<Prefix>** and **<Suffix>** declared in the settings of the moisture analyser comply with **<Prefix>** and **<Suffix>** in the code, the test result will be **<Positive>**,
- **<Prefix>** and **<Suffix>** declared in the settings of the moisture analyser do not comply with **<Prefix>** and **<Suffix>** in the code, the test result will be **<Negative>**.

## 23.4. Environmental module

It is possible to connect the THB environmental module to the moisture analyser through UDP or USB ports. To assure proper cooperation, select the suitable port for the environmental module.

## 23.5. IM02 communication module

The IM02 communication module allows cooperation of the moisture analyser with such accessories as: printer, control keys, light columns, buzzers, PLC controllers and other control and signalling devices, as well as PCs.

| | |
|---|---|
| ⚠ | ***The procedure of connecting the IM02 communication module to the power network and moisture analyser has been described in greater detail in the „IM02 communication module" manual.*** |

### 23.5.1. Activation of connection of IM02 to the moisture analyser

- Connect IOIOI port of the IM02 communication module to COM 3 (IOIOI) port of the moisture analyser using the dedicated PT0454 cable.
- Enter **<Devices / IM02 communication module / Active>** submenu and activate the IM communication module ( - module enabled, - module disabled).
- After connecting the IM02 communication module to the moisture analyser, the following information will be displayed automatically:

| | |
|---|---|
| **Status** | Active connection status: Connected, Not Connected. |
| **Software version** | IM02 communication module software version. |
| **Manufacture version** | IM02 communication module manufacture version. |

- Simultaneously the moisture analyser menu will be extended to include **<Inputs / Outputs>** submenu and a list of available communication ports in **<Communication>** submenu.

## 23.6. Modbus TCP

| | |
|---|---|
| ⚠ | ***For detailed information regarding Modbus protocol read „MODBUS TCP - Communication Protocol of PUE CY10".*** |

**Modbus TCP** protocol can be used via the Ethernet communication interface. Configuration of Modbus TCP protocol settings can be found herein the **<Devices / Modbus TCP>** submenu.

Submenu structure **<Modbus TCP>**:

| | |
|---|---|
| **Active** | Activation/deactivation of the Modbus TCP transmission protocol. |
| **Port** | Number of port for transmission protocol (by default **502**). |

# 24. INPUTS / OUTPUTS

*Applies to the active IM02 communication module*

The weighing indicator can support **4 inputs / 4 outputs** through connection with the IM02 communication module.

Access path: **<🏠 / Inputs/Outputs>**.

## 24.1. Input configuration

- Enter **<Inputs / Outputs>** submenu.
- Select **<Inputs>** field to see a list of available inputs.
- Edit the desired input to see a list of functions to be assigned. The list of functions is analogical to the list of key functions for a specific mode.
- Select the desired function from the list and return to the home screen.

| | |
|---|---|
| ⚠ | ***For factory settings, functions of all inputs have <None> option.*** |

## 24.2. Output configuration

When you assign a specific function to the output, you also activate it. If the specific output has not been assigned any function, it remains inactive.

**Procedure:**

- Enter **<Inputs / Outputs>** submenu.
- Select **<Outputs>** to see a list of available outputs.
- Edit the desired output to see a list of functions to be assigned:

| | |
|---|---|
| **None** | Output inactive. |
| **Stable** | Stable weighing result above LO mass. |
| **MIN stable** | Stable weighing result below MIN threshold. |
| **MIN unstable** | Unstable weighing result below MIN threshold. |
| **OK stable** | Stable weighing result between MIN and MAX thresholds. |
| **OK unstable** | Unstable weighing result between MIN and MAX thresholds. |
| **MAX stable** | Stable weighing result above MAX threshold. |
| **MAX unstable** | Unstable weighing result above MAX threshold. |
| **! OK stable** | Stable weighing result out of OK threshold. |
| **! OK unstable** | Unstable weighing result out of OK threshold. |
| **MIN** | MIN threshold signalling. |
| **OK** | OK threshold signalling. |
| **MAX** | MAX threshold signalling. |
| **! OK** | Weighing result signalling out of OK threshold. |
| **Zero** | Zero weighing result („zero” indicator). |

- Select the desired function from the list and return to the home screen.

| | |
|---|---|
| ⚠ | ***For factory settings, functions of all outputs have <None> option.*** |

# 25. OTHER PARAMETERS

This menu contains global information on operation of the device, such as language, date – time, acoustic signal, screen calibration, level control. To enter <Miscellaneous> submenu, press Setup key and then <Miscellaneous> key.

## 25.1. Interface language selection

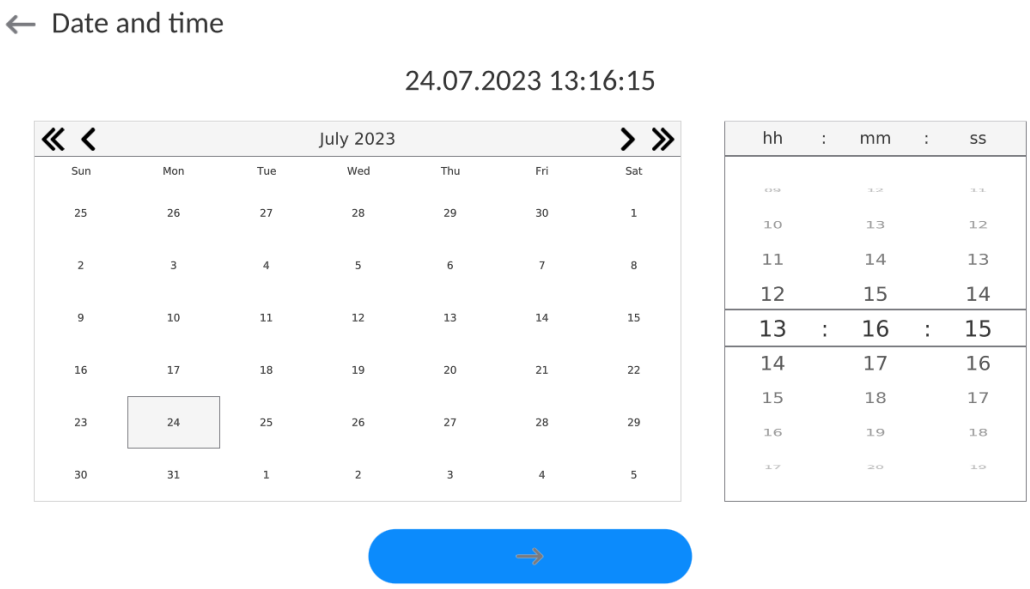
**Procedure:**
Enter <Miscellaneous> submenu, select <Language> option and choose the communication interface language.
Available languages: Polish, English, German, French, Spanish, Korean, Turkish, Chinese, Italian, Czech, Romanian, Hungarian, Russian, Serbian.

## 25.2. Date and time settings

You can set the date and time as well as select the data format display and print these data out.
To enter the date and time settings, take either of the following steps:

- press **<Date and time>** field in the top bar of the home screen,
- enter: **<**Setup **/ Miscellaneous / Date and Time>** submenu.

When you enter the date and time settings edition, you will see an on-screen keypad. Set relevant values, i.e. year, month, day, hour, minute, and confirm changes.



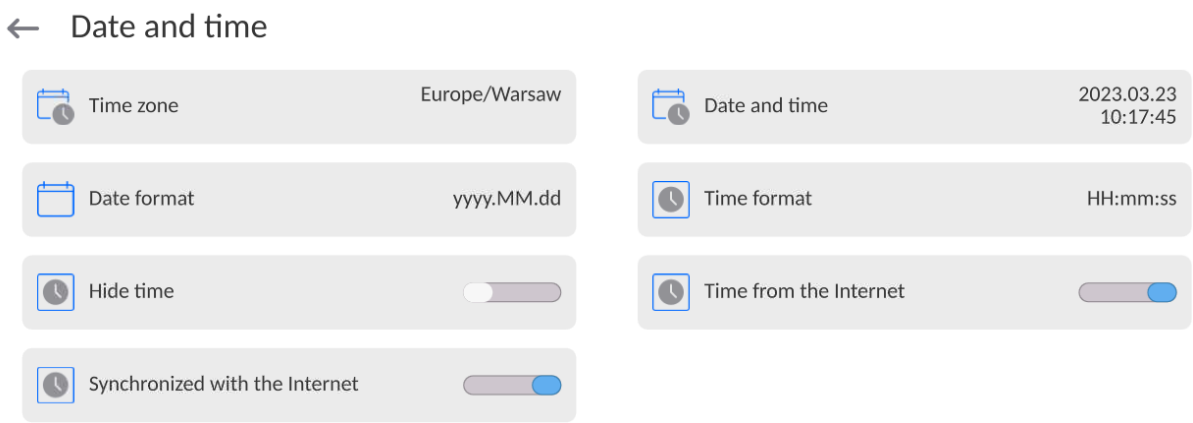

**<**Setup **/ Miscellaneous/ Date and Time>** submenu contains additional functions used to define the date and time format:

| ***Name*** | ***Value*** | ***Description*** |
|---|---|---|
| Time zone | Europe, Warsaw | This parameter adopts the value: name of zone/country. A specific name of the zone/country is related to the information on whether a standard (winter) time changes into summer time (and the other way round), and a specific day of the year on which the change occurs. |

| | | |
|---|---|---|
| Date and time | 2016.04.04<br>08:00:00 | Here it is possible to set the date and time of the internal clock. |
| Date format | yyyy.MM.dd * | Data format selection.<br>Options:<br>▪ d.M.yy,<br>▪ d.M.yyyy,<br>▪ dd.MM.yy,<br>▪ dd.MM.yyyy,<br>▪ dd.MMM.yyyy,<br>▪ yyyy.MM.dd,<br>▪ yy/MM/dd,<br>▪ d/M/yy,<br>▪ dd/MM/yy,<br>▪ dd/MM/yyyy,<br>▪ M/d/yy,<br>▪ M/d/yyyy,<br>▪ MM/dd/yy,<br>▪ MM/dd/yyyy.<br>▪ dd-MM-yy,<br>▪ dd-MMM-yy,<br>▪ yy-M-dd,<br>▪ yy-MM-dd,<br>▪ yyyy-M-dd,<br>▪ yyyy-MM-dd, |
| Time format | HH:mm:ss ** | Time format selection.<br>Options:<br>▪ H.mm.ss,<br>▪ HH.mm.ss,<br>▪ H.mm.ss tt,<br>▪ HH.mm.ss tt,<br>▪ h.mm.ss tt,<br>▪ hh.mm.ss tt,<br>▪ H:mm:ss,<br>▪ HH:mm:ss,<br>▪ H:mm:ss tt,<br>▪ HH:mm:ss tt,<br>▪ h:mm:ss tt,<br>▪ hh:mm:ss tt,<br>▪ H-mm-ss,<br>▪ HH-mm-ss,<br>▪ H-mm-ss tt,<br>▪ HH-mm-ss tt,<br>▪ h-mm-ss tt,<br>▪ hh-mm-ss tt. |
| Hide time | No | Enable/disable date and time display in the home screen. |
| Internet time | Yes | If the device is connected to the Internet, it is possible to update the time and date from the web. |
| Synchronised with Internet | Yes | This parameter informs you whether time and date in the device have been synchronised with data on the Internet. |

*) - For date format: y – year, M – month, d – day
**) - For time format: H – hour, m – minute, s – second

The date and time preview with special regard to declared formats can be found in the <Date and Time> field.




***Note:*** *The access to <Date and Time> parameter settings is granted only to the operator with relevant permission. The permission level can be modified by the administrator in <Permission levels> menu.*

### 25.3. Extension module

This option allows you to activate compliance of the device for FDA 21 CFR procedures, extend the communication protocol in the device, and deactivate standard license (the so-called demo moisture analyser).
To activate it, you need to know the license number for particular options. To gain this number, contact the manufacturer.

**Procedure:**

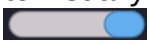
- Enter <Miscellaneous> submenu and select <Extension module> field. Follow the messages displayed in the screen.

### 25.4. Sound

**Procedure:**
Enter <Miscellaneous> submenu and select <Sound> parameter and then set as relevant:

| | |
|---|---|
| Result approval sound | – Yes/No |
| Touch screen sound | – Yes/No |
| Sensors | – Yes/No |
| Volume | – range up to 100% |

### 25.5. Visual result approval

This option allows you to visually confirm and record the measurement in the weighing base. Switch the option into  to make sure every measurement is communicated to the operator through temporary illumination of the mass display in blue.

### 25.6. Screen saving

It is possible to activate the screen saving procedure.
To do so, follow the steps below:
Press Setup key and then: <Miscellaneous/Screensaving>.
Start editing and select one of the following values: [None; 1; 2; 3; 5; 10; 15]. Digital values are set in minutes. Select one of the values and then return to the previous menu.

***Note:***
*The screen saving procedure is initiated only when the device is not used (no changes to mass in the screen). In the screen saving mode, when the program can detect any changes to the mass or when you press the screen or key on the housing, you go back to weighing.*

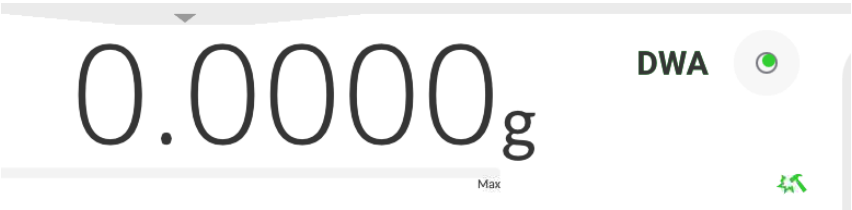
### 25.7. Display brightness

The display brightness has an influence on how long the moisture analyser operates on a battery. If you want to prolong the continuous operation as much as possible, lower the brightness.
To do so:
Press the Setup key and then: <Miscellaneous/Display brightness>.

When you start editing, enter the value: [0% - 100%]. Enter the relevant value to automatically change the display brightness and return to the previous menu.

### 25.8. Vibration detection

The moisture analyser program serves to detect incorrect distribution of the sample on the weighing pan that may lead to increased errors. If this function is activated, it is signalled through emergence of the relevant icon on the mass display.




If the program can detect incorrect distribution of the sample on the weighing pan, the icon will turn . It means that the result may be subject to increased error.

**Procedure:**

- Enter <Miscellaneous> submenu.
- Select <Vibration detection> field,
- Select one of the following options:
    - Yes – function enabled
    - No – function disabled

### 25.9. Level control

The device is equipped with the Automatic Level Control mechanism.
In non-verified balances, you can define the method of its operation.
In verified balances, settings are invisible and comply with factory set values: <Active with lock>, weighing is possible only when the device has been levelled.

**Procedure:**

- Enter <Miscellaneous> submenu.
- Select <Level control> to open an edition box.
- Select one of the following options:
    - None – level indicator is not displayed, the device does not control the level,
    - Active – level indicator is displayed, the device shows level changes through specific colours (green □ OK, red □ level lost),
    - Active with lock – level indicator is displayed, the device shows level changes through specific colours (green □ OK, red □ level lost); when the indicator is red, – no Level – message is displayed and weighing is not possible).

***Note:*** *The method of levelling has been described in 15.3 of the manual.*

### 25.10. Decimal separator

This parameter allows you to select a decimal separator in the mass printout.

**Procedure:**

- Enter <Miscellaneous> submenu.
- Select <Decimal separator> and you will see an edition box.
- Select one of the options:
    - Dot
    - Comma

Select the value to return to the submenu window.

### 25.11. Sensors sensitivity

This parameter available in the range from 0 to 9 determines the distance at which sensors are going to react.
By default the value ranges from 5 to 7.

**Procedure:**

- Enter <Miscellaneous> submenu.
- Select <Sensors sensitivity> parameter and you will see an edition box.
- Select one of the values. Select the value to return to the menu window instantly.

### 25.12. Start-up logo

*(Available only to the authorised operator).*

This parameter allows you to change the image that shows up in the display while launching the device system.

### 25.13. System event export

*(Available only to the authorised operator).*

This option allows you to generate a special file that is saved automatically after enabling the option in the (pendrive) external memory connected to the USB port. The file is used to diagnose potential malfunctioning of the device by the RADWAG service team.

**Procedure:**

- Put the pendrive memory stick into a USB port.
- Next enter <Miscellaneous> submenu.
- Select <System event export> field.
- The program will generate a special file and save it on the pendrive automatically.
- Such a file must be sent to RADWAG.

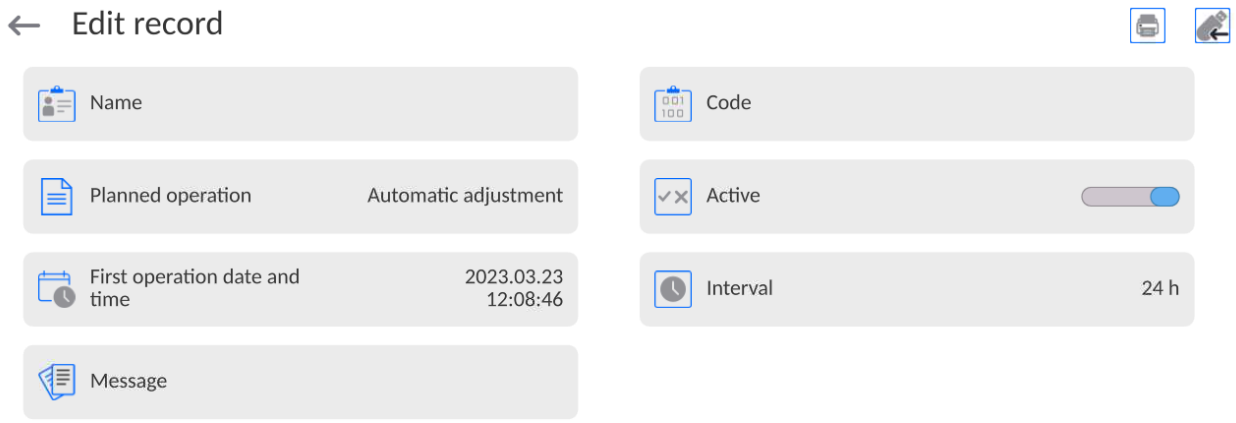
### 25.14. Text-to-speech conversion

This parameter allows you to activate processing of names of particular groups and menu parameters into speech emitted from the measuring head speakers.
The voice is emitted in English only.

# 26. SCHEDULED OPERATIONS

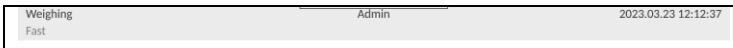
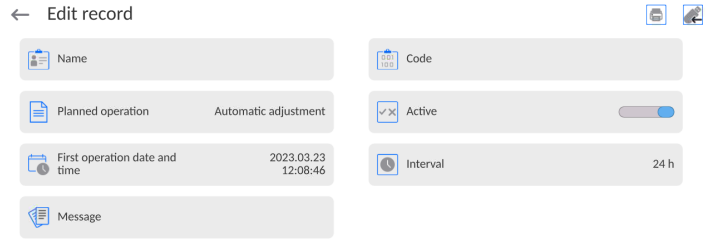
This menu contains settings that allow you to schedule recurring operations, such as moisture analyser adjustment or special message display.

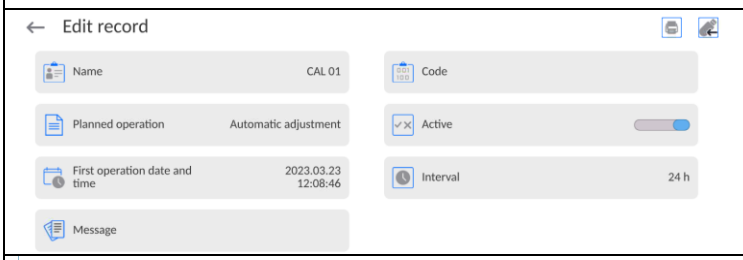
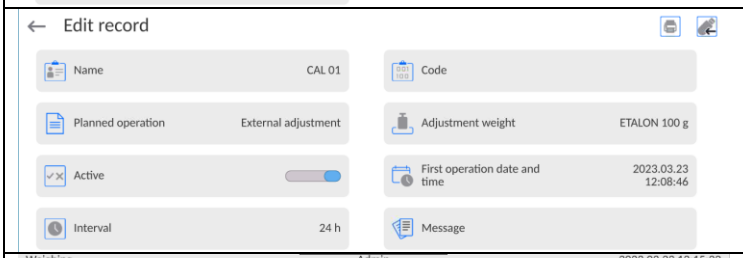
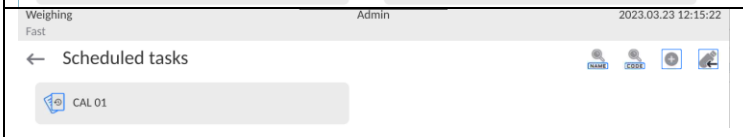
## 26.1. Adjustment




<Scheduled adjustments> parameter allows you to declare the exact time and interval for device adjustment. You can schedule the external adjustments. To schedule external adjustments, enter weights used to make adjustments into the memory of the device.

**Settings:**
Before setting the calibration plan, enter templates and data for external adjustments.
To do so, enter the operator's menu, and <Adjustment> parameters group and find <Adjustment weights> parameter and enter the weight by giving its data:

| | |
|---|---|
|   | Enter operator menu, select <Scheduled tasks> parameter.<br>A window opens in which an authorised user (Administrator) can add entries with scheduled adjustments. |
|   | In order to add a new entry, press button, wait for a window with data on the scheduled adjustment to open. |
| | Select task: automatic adjustment (internal or external). |

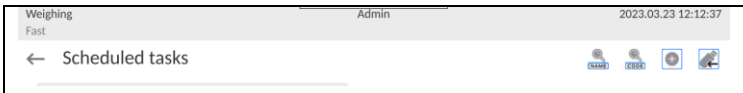
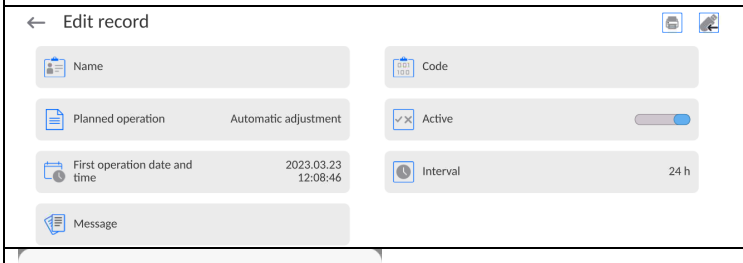
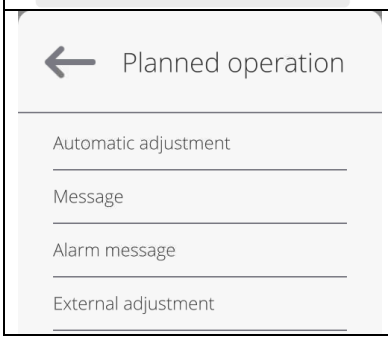
| | |
|---|---|
|  | For automatic adjustment option, enter data on the adjustment and its schedule. |
|  | For external adjustment option, enter data on the adjustment, mass standard used for the adjustment performance and its schedule. |
|  | When all necessary data has been introduced, return to the previous window. The window features newly added entry. |

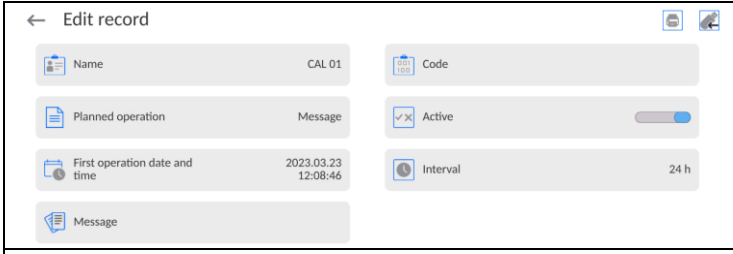
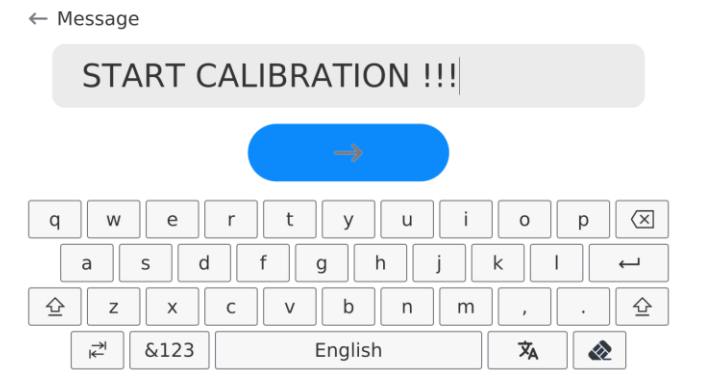
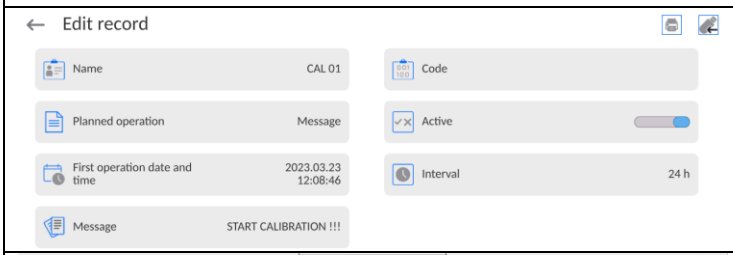
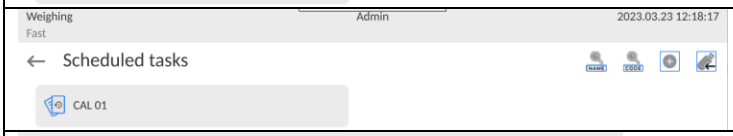
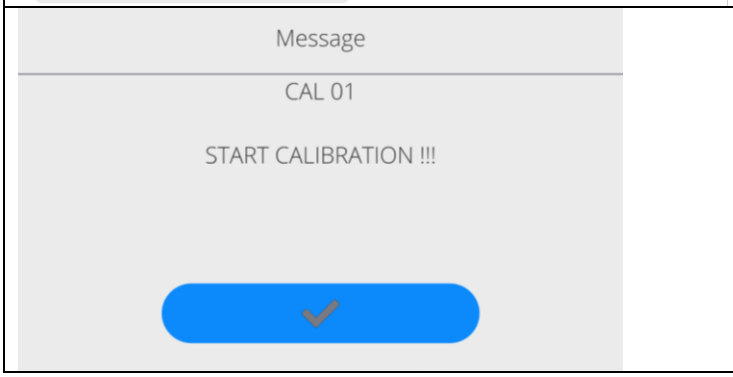
Once all data have been entered, leave the menu.

From now on, adjustments will be performed automatically: as scheduled and with intervals specified.

## 26.2. Message

This parameter allows you to declare the exact time and interval for displaying a special message that informs you about a need to take some action at a specific moment.

| | |
|---|---|
|  | Enter user menu, next enter <Scheduled tasks> submenu.<br>In order to add an operation, press button placed in a toolbar. |
|  | <Edit record> box is displayed, press <Scheduled tasks> field. <Scheduled tasks> box is displayed. |
|  | Select <Message> option. |

| | |
|---|---|
|  | Message settings box is displayed.<br>Set message display frequency (first display, time interval), select <Message> parameter and enter message text. |
|  | Press button to confirm. |
|  | A previous window is displayed. |
|  | In <Scheduled tasks> box, a newly added operation is displayed.<br>Go to the home screen. |
|  | When message display criterion is met (time), message box is displayed automatically.<br>Press button, the message box gets closed, perform the operation. |

## 27. UPDATE

It contains the following modules that can be used to update:

- A field related to the operator: APPLICATION.
- Motherboard (administrator only).

Updating is automatic through collection of information from the external USB memory.

**Procedure:**

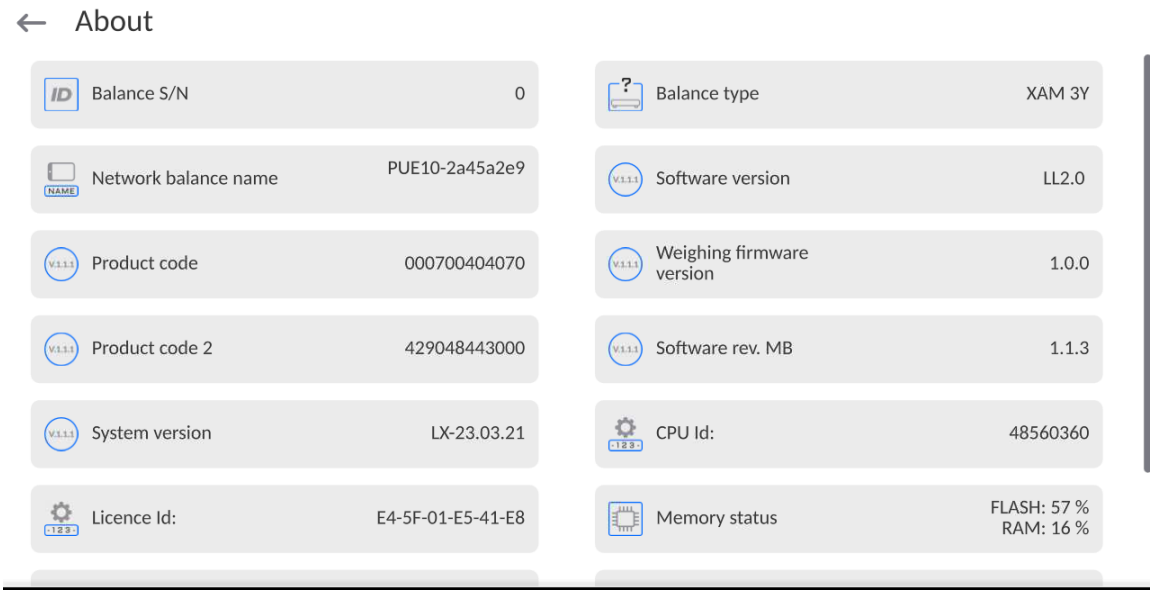
- Prepare a USB flash drive with the update file. Required file extension: **.lab4.*
- Connect the USB flash drive to the USB port of the indicator.
- Log in as the Administrator.
- Press button to enter the balance menu.
- Select <Update> option.
- Select <Application> field.
- The display previews the content of the USB flash drive; search for the update file and press its name.
- The balance is automatically restarted, and the balance application is automatically updated.
- If the balance does not restart, force it to restart by turning it off and on again.

Update of the main board file is analogous; required file extensions are: *.cm4mbu – main board.

To update files of the motherboard is similar to update of the Application. The only difference is that files must come with relevant extensions (*.cm4mbu).

## 28. SYSTEM INFO

This menu contains information on the device and installed software. Most of the parameters are for reference only.




In <Environment> parameter, you can see environmental parameters: temperature, humidity, pressure (when the device is equipped with special sensors).
Select <Settings printout> parameter to send the settings (all parameters) to the printer.

# 29. COMMUNICATION PROTOCOL

| | |
|---|---|
| ⚠ | ***A detailed description of the computer communication protocol can be accessed in the „CBCP-07" manual.*** |

## 29.1. Manual printout/automatic printout

You can generate printouts from the moisture analyser manually or automatically.

- Manual printout: press ↵ key when the readout has stabilised.
- Automatic printout is generated automatically as per the settings for the automatic printout (see: point 15.4).

The content of printout depends on setting for <Standard printout> - <Weighing printout template> (see: point 15.4).

**Mass printout format**:

| 1 | 2 | 3 | 4 -12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|---|---|
| stability mark | space | mark | mass | space | unit | | | CR | LF |

| | |
|---|---|
| Stability mark | [space] if stable<br>[?] if unstable<br>[!] if air lift compensation function is enabled<br>[^] if the out of range + error occurs<br>[v] if the out of range – error occurs |
| Mark | [space] for positive values or<br>[-] for negative values |
| Mass | 9 marks with dot and right alignment |
| Unit | 3 marks with left alignment |

**Example:**

_ _ _ _ _ _ **1 8 3 2 . 0** _ **g** _ _ **CR LF** – printout is generated when ↵ key is pressed, for settings for <Weighing printout template>:

| | | | |
|---|---|---|---|
| N (number of measurements) | **NO** | Universal variable 1 … 5 | **NO** |
| Date | **NO** | Net | **NO** |
| Time | **NO** | Tare | **NO** |
| Levelling | **NO** | Gross | **NO** |
| Client | **NO** | Current result | **NO** |
| Warehouse | **NO** | Additional unit | **NO** |
| Product | **NO** | Mass | **YES** |
| Packaging | **NO** | Non-standard printout | **NO** |

## 30. CONNECTION OF PERIPHERALS

The 5Y-series moisture analyser can cooperate with the following equipment:

- computer,
- receipt printer,
- PCL6-supporting printer,
- barcode scanner,
- fingerprint scanner,
- any peripheral device that supports ASCII protocol.

***Note:*** *Only accessories listed on RADWAG's website can be connected to the moisture analyser.*

## 31. ERROR MESSAGES

| | |
|---|---|
| Max weighing threshold exceeded<br>Unload the weighing pan | Display capacity out of range<br>Unload the weighing pan |
| Min weighing threshold exceeded<br>Install weighing pan | Zeoring out of range<br>Press tarring button or restart the balance |
| Start mass out of range<br>Install weighing pan | Zeoring/tarring time out of range<br>Weighing indication unstable |
| Tarring out of range<br>Press zeoring button or restart the balance | |

| | |
|---|---|
| -no level- | Balance not levelled |
| -Err 100- | Weighing module restart |
| In process | During this process, the readout may be unstable (feeder – tablet feeding procedure or comparator – load changing procedure) |

## 32. ADDITIONAL EQUIPMENT

| **Type** | **Name** |
|---|---|
| RTP-UEW80 or RTP-RU80 | Receipt printer |
| | Printers supporting PCL6 (*Printer Command Language*) – connected via USB port |
| LS2208 | Barcode scanner |
| SAL | Anti-vibration table |
| | PC keyboard |

**Software:**

- **E2R- Moisture Analyzers - software**

## 33. ATTACHMENT B – List of programmable keys

| Pictogram | Name | Pictogram | Name |
|---|---|---|---|
| | None | | Balance calibration/adjustment |
| | Profile | g-ct-lb | Unit |
| | Product | LO HI | Checkweighing thresholds |
| | Packaging | | Zero |
| | Client | | Tare |
| | Operator | | Set tare |
| | Warehouse | | Disable tare |
| | Parameters | | Restore tare |
| | Confirm/approve | -123- | Series number |
| | Abort | -ABC- | Batch number |
| | Help | 1 VAR | Universal variable 1 |
| | Local parameters | 2 VAR | Universal variable 2 |
| | Working modes | 3 VAR | Universal variable 3 |
| | Logout | 4 VAR | Universal variable 4 |
| | Voice command | 5 VAR | Universal variable 5 |
| | Create screenshot | 0.0 | Hide 1 digit |
| | Print | 0.00 | Hide last two digits |
| | Print header | 0.000 | Hide last three digits |
| | Print footer / C label | | Drying program |
| E-SIGN | E-signature | STOP | Instant termination of drying |
| | Sample description | | Open/close drying chamber |

## 34. ATTACHMENT H – manufacturer’s address data

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