BEL ENGINEERING

# Microbalance
# **Mu** series
# USER MANUAL

## INDEX

**WARNING:**
Please read carefully following instructions for installation and use before starting your work with a new balance. A use of the instrument different from the one mentioned in this manual does not grant product safety anymore.

# 1 Positioning the instrument

## 1.1 1.1 Preface

Balances with resolutions 0.001mg are instruments of high sensitivity and precision. To achieve reliable and accurate results it is fundamental to install the instrument in a suitable environment to meet the requirements necessary to ensure its proper functioning.

## 1.2 Place recommended to install the instrument

Choose of the correct placement of the instrument is fundamental to ensure optimal and precise operations.

**For optimum weighing it is necessary to respect the following criteria:**

**- TYPE OF ENVIRONMENT**

- Place the balance in a corner of the room to minimize vibrations.
- Place the balance in a secluded location: not put it near doors to prevent air drafts.
- Avoid places with many persons: every person who is close generates a draft of air.
- Protect the balance from an air conditioner or ventilation fans and other electronic devices with fans (e.g. Computer or other laboratory instruments).
- Keep the room temperature as constant as possible, at a value between 15 and 30 ° C. You must use a conditioner (but leave the speed of the fan to a minimum to avoid excessive air drafts).
- Keep the humidity where balance is used as constant as possible, it should be between 40% and 65% of moisture.
- Place the balance away from heat sources, e.g. heaters, light bulbs (use tubular lamps), windows (the warmth of the sun's rays can filter out the window and may affect the weighing result).

**- TYPE OF TABLE**

- The table must be **stable**: must not sag during lean of the instrument (e.g. Laboratory bench or marble / granite counter top).
- Must be as **anti-magnetic** and **anti-static** as possible.
- Must be **reserved** to the balance.

The balance should be positioned as close to the legs of the table as possible, not in the middle of the table. There is less vibration near the table legs.

# 2 Recommendations for a correct use of the instrument

## 2.1 Preface

To obtain accurate and repeatable weighing pay attention to the following.

## 2.2 First power on

- When connecting the balance to the power supply for the first time, make sure that the balance is warmed up, depending on the balance model:
    - Micro balance with an accuracy of 0.001mg requires warm-up time of **24-36 hours.**
- For a correct use of the instrument never disconnect the balance from the mains. If you want to turn it off, use the ON / OFF button to put it in **Stand-by** (in this way it is not necessary to wait each time the warm up time).

## 2.3 Using the Balance

- **Level the balance**. It is fundamental always to level properly the instrument: regularly check that the air bubble is at the center of the level. Adjust the feet of the balance to ensure the leveling
- Load the sample to weigh always in the **center of the plate** to avoid possible errors.
- Open the glass doors of the wind-shield as less as possible and use the **tweezers** to load/unload the samples to be weighed.
- Pay attention to possible **Static charges** that may be generated due to containers with materials of low electrical conductivity or due to dry air with less than 40% moisture. Electrostatic charges can alter the results of the weighing. It is recommended to use the **Ionizer Mod. Ion-A15** to eliminate static charges present on any substances to be weighed or that has accumulated on the instrument.

  - Because of static charges the results of weighing are always different, the balance **is not repeatable**.

- Pay attention to **dynamic push**: a big **temperature** difference between the sample to be weighed and the weighing chamber creates air drafts along the sample. A colder object appears heavier while a warmer object lighter, this effect is reduced when it is reached the thermal equilibrium between sample and weighing chamber.

- With the dynamic push you will get results that **move in one direction** depending on whether the material is colder or warmer.

- Pay attention to substances that can **Evaporate** (alcohol) or **Absorb humidity** (silicon gel). Because of these types of materials weight may vary **constantly in one direction.**

- Be careful to **Magnetic** materials: magnetic objects will attract each other, the force that results are wrongly interpreted as a load.

- With magnetic materials the weighing results are hardly repeatable, the indication remains stable but weighing result provides different results.

## 2.4 Care and cleaning of the balance

- Before **cleaning**, remove all removable parts
- To clean the weighing chamber, the plate, the glasses and the other parts please use an **antistatic** liquid (do not use cloths that can leave fragments).

## 2.5 Precautions

- Operate the balance under the ambient conditions specified in this manual.
- Do not use electronic balances in wet, dangerous or unstable environments
- Services must be provided by professionals and genuine accessories must be used. If you need the above, please contact your dealer.
- The device may be damaged if it is used in a manner not specified by the manufacturer.
- The balance is suitable for indoor use only
- Do not place the balance upside down.
- Do not allow liquids to enter the balance
- Do not immerse the balance in water or other liquids
- Connect the power cord only to a compatible grounded electrical outlet
- Make sure the power cord does not create a snag or entanglement hazard
- Before use, please make sure that the input voltage on the power plug must match the local AC power supplier
- Place the balance where it can be easily connected to a power outlet
- Do not overload the balance
- Do not drop heavy objects on the weighing pan
- Using the balance carefully, place the item to be weighed gently in the center of the pan. Avoiding rough handling will help extend the life of your scale
- For best results, use the device at the specified optimum operating temperature

## 2.6 Unpacking

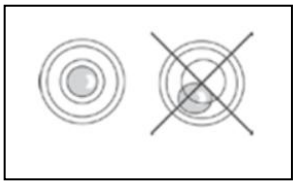
Carefully remove the balance and its parts from the packaging. The components included vary by balance model (see table below). Keep all packages in case of return

## 2.7 Packing list

| Part | Qty | Remark |
|---|---|---|
| Balance | 1 | |
| Balance indicator | 1 | |
| Weighing pan Ø 30 mm | 1 | |
| Metal windshield ring | 1 | |
| Connecting cable | 1 | |
| weight, gloves, tweezers | 1 | 2g or 5g weight |
| power supply | 1 | 12V (Ionizer) |
| power supply | 1 | 24V (balance) |
| user's guide | 1 | |

## 2.8 Leveling

Using the two feet on the back of the balance, level the balance in the correct working position and observe the level bubble, which must be in the centre of the black circle



Raise the balance → rotate the foot clockwise

Lower the balance → turn the foot counter clockwise

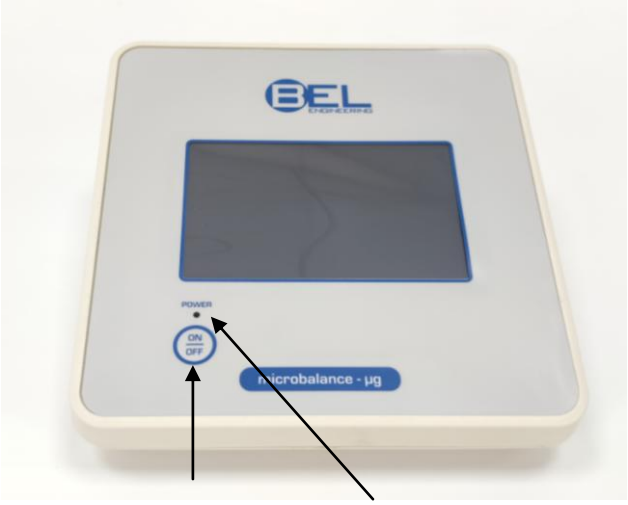
## 2.9 Connecting to the power supply

Insert the mains plug into the DC plug on the back of the balance. Only use the power supply supplied with the balance

# 3 Indicator and USB port

The switch on/off key is located on the balance keyboard

Switch on/off key (10), operation LED indicator light (11), USB port (12)




**10** **11**


**12**

After connecting the power supply to the mains, the balance starts automatically **without** pressing the power button (10).
When the power cord is already plugged in, use the power button (10) to switch off the balance and restart the system.
The USB port is used **to import and export** data or to update the balance's operating system using a USB stick.

**NOTE**: The balance is turned on and off for approximately 20 seconds, during which time the display will be black.
When powering on, wait for the splash screen to appear before doing anything else.
Wait for the green LED (11) to go switch off before removing the power cord (if necessary)

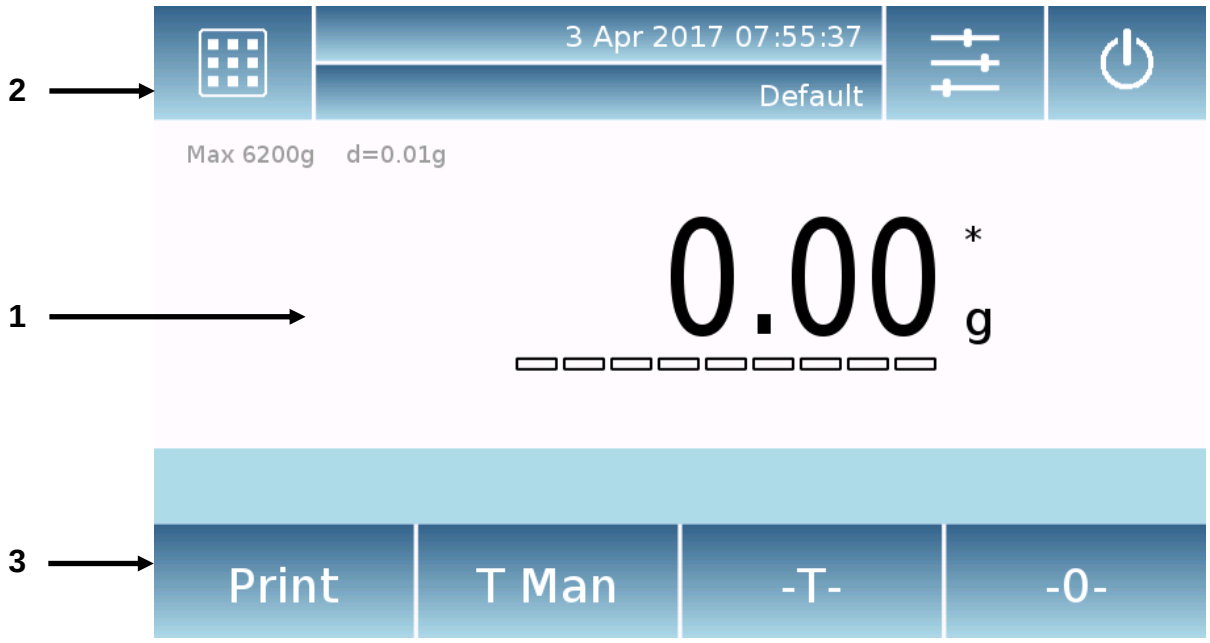
# 4 Serial interface connections

The balance is equipped with an RS 232C interface for connection to a serial printer.
To ensure communication between the balance and a printer, the following conditions must be met:
Connect the printer using a suitable cable matching the position of the printer signals with the balance ones.
Set the transmission speed and type of printer correctly according to the parameters of the printer. See Chapter 7.7


N.B. It is recommended that you use one of the printers listed in chapter 7.7 (Mod. dpp250, TLP50, TX-110) to ensure proper print operation. (If you are using different printers, you will not be able to print charts where available).

## 4.1 Display area operation

The balance comes with a color touch screen display that lets you touch the screen in active areas to quickly access the various menus and features.




### 1

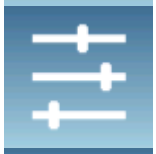
Indication area for weighing values

| | |
|---|---|
| g | Measuring unit indication, by touching the symbol, you can access the measurement unit menu and select the desired unit. |
| * | Stability indicator. |
| T Man | Indication of weight displayed.**Net** net value, **Ldr** gross value |
| T = | Tare value indicator. |
| | Real time weight value indication bar. |
| Max 6200g d=0.01g | Indication of the metrological data of the balance |

# 2

Bar displaying the date, time, user selection, access to weighing functions, weighing and balance shutdown parameters settings.

Touch this area to access the functions menu.



Touch this area to access the menus for weighing settings, display preferences, peripheral setup, and user's customization.

Touch this area to access the switching on/off and stand-by menu of the balance.


Touch this area to access the users menu to quickly select the user desired.

# 3

Function key display bar.
Touching the keys displayed in this area, you will start the corresponding function. Below are all the keys available in the simple weighing screen. The functions key bar change according to the selected applications.



Key bars available in simple weighing screens.

**Print:** Data printing key.

**-0-:** Zeroing/Resetting key.

**-T-:** Tare operation key.

**Gro/Net:** Net or gross weight display mode key.

**T Man:** Key for entering a tare value manually.

### 4.1.1 Operating the alphanumeric keypads for inputting data

The alphanumeric keyboard described below is valid for all data entry operations in the various operating modes of the balance.

Mode 1


Alphanumeric keypad.

Selection key for entering uppercase or lower case letters

Delete key of the last entered character


Delete key for all entered characters

Back and forward cursor movement key on the inserted string


Key to confirm and store the entry

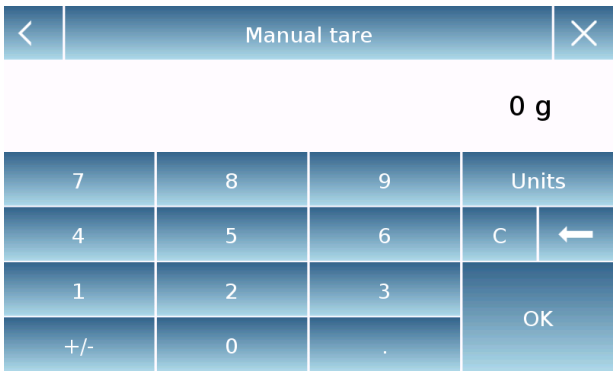
Mode 2



Keyboard character selection key. Touch this key to change the various characters available for entry:
Mode1, Mode 2, Mode 3

Mode 3


Input operation abort key.




Numeric keypad.

Delete key of the last entered character

OK

Key to confirm and store the entry

C

Delete key for all entered characters

Input operation abort key.

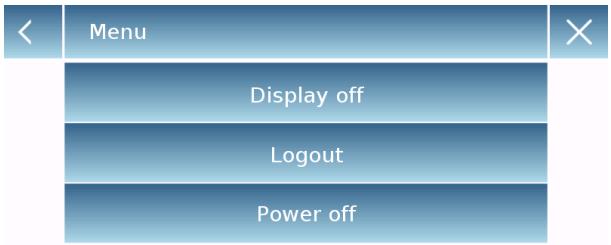
Unità

Key for selecting the measurement unit.

# 5 Standby, logout, switching off functions

After inserting the power cord into the mains socket, the balance will automatically turn on showing the basic weighing screen.


Touch the area with the symbol to access the switching off menu.



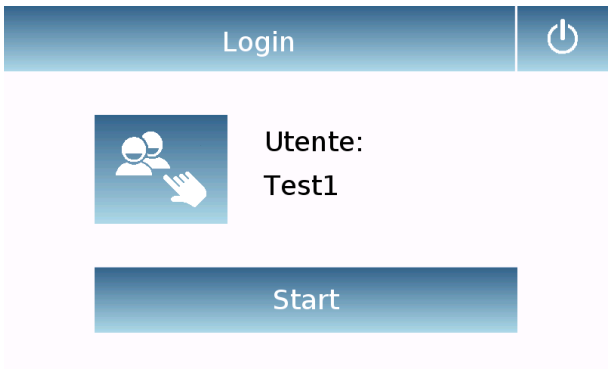

There are 3 switching off modes:

- Display off.
- Logout.
- Switching off.

Display off

By selecting the display off mode, the balance will go in the standby mode, the display will be off and it will be shown only the lower-right command symbol to turn on the system again.

Touch the symbol to return to the basic weighing screen.




Logout

Selecting the logout mode the current user will be logged out.

Touch the key **"Start"** to enable again the user and, if the user is password-protected, you will be required to input the password.

Touching the key , you can select another user.

Switching off

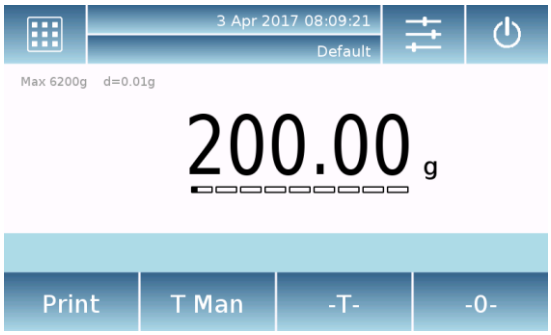
By selecting the power-off command, the balance will be off. To restart, you will need to press the key on the left side of the balance or remove the power plug and reinsert it.

# 6 Simple weighing

After connecting the power, the green status LED on the left side of the balance will light up. This phase will last about 20 seconds, and the display will remain off all the time. After the system booting, a screen will show the capacity and resolution of the balance. Then the balance will go in the simple weighing screen.
At first power on, the balance starts by activating the default user with the factory settings.
Be sure that the balance has been leveled and calibrated.


In the weighing screen, the area displaying the weight shows the value of the weight placed on the balance plate.

Use the **-0-** key to set a new zero point and reset all tare values if any.




If you work with weighing containers, first zero the balance. Place the container and touch the **"-T-"** key.

Or use the **T Man** key to enter a known tare value manually.


The **Net** symbol on the display indicates the net weight. Press **"Net"** to see the gross weight **"Lrd"**.
**"T ="** indicates the tare value acquired.


Place the sample to weight on the balance and wait for the stability symbol to light up before acquiring the value.


Press “**Lrd**” and “**Net**” to display the gross and net weights and vice versa.


To reset the balance, remove all items from the plate and press the “**- 0 -**“ key.

If you entered a manual tare, press **“ T-Man” and “C”** key to clear the tare value.

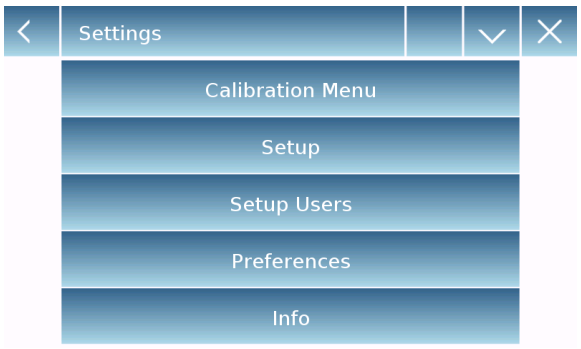
# 7 Customized settings

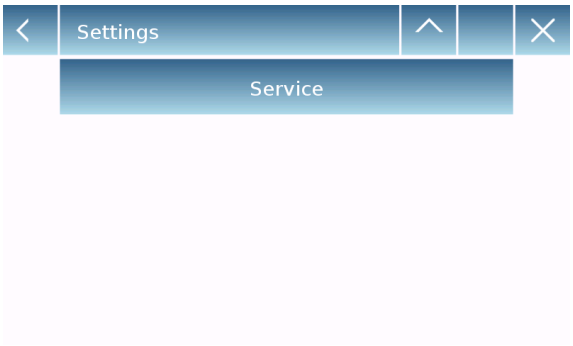
This section explains all the customization features of the balance. Each function described below can be set differently for each user.
**N.B.** Some settings can only be modified by users with administrator rights.

- Calibration menu
- Setup
- Users setup
- Preferences
- Info
- Service

To access the settings menu, touch the key in the top bar of the display.


The following screens will be displayed showing the choices of the setting menu.




Indicator of the number of pages available.
To scroll through the next and back pages, touch on the arrows.

Return to the previous screen

Exit from the menu

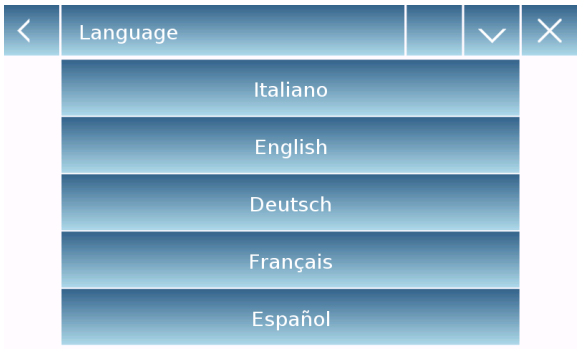
Symbol that indicates that the choice is not available or not enabled for users without administrator rights.

## 7.1 Selecting the language

In the settings menu, select the "**Preferences**" function.


Touch **“Language”** in the menu list.

You can select the balance's system language.




Then select the desired language. Automatically, all screens will be translated into the selected language.

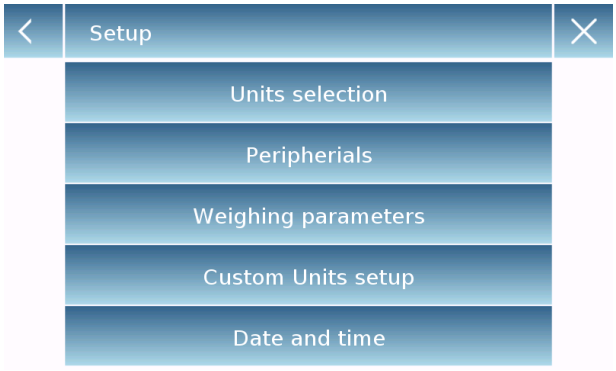
The languages available are: Italian, English, German, French, Spanish, Portuguese and Chinese


**N.B. The selected language will only be assigned to the current user logged in.**

## 7.2 Setting date and time

Select “**Setup**” in the settings menu.
Enter the new date and time. You can also select the 24-hour or 12-hour format for the time.

N.B. The date and time setting is not customizable for each user, but once defined it will be changed for all.

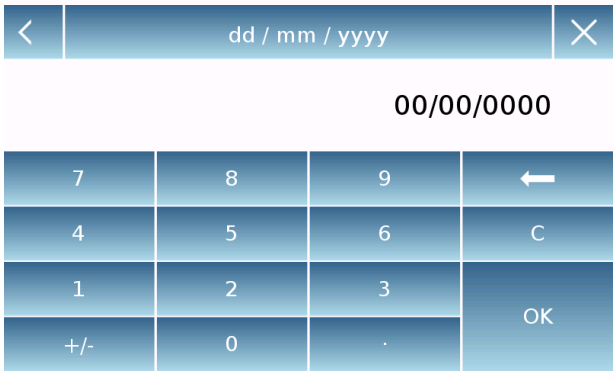



Touch “**Date and time**” in the menu list.


Touch “**Date**” in the menu list to change the date.

Touch “**Time**” in the menu list to change the time

Touch “**24h – 12h**” in the menu list to set the time format.




A numeric keypad will be displayed for entering the date and time in "**“dd/mm/yyyy”** mode for the date and **“hh:mm:ss”** for the time

Touch “**OK**” to confirm the new settings, **“C”** to delete all entered data or touch “**X”** to exit without changing the value.

## 7.3 Creating, changing and selecting the user profile

The balance can be customized for multiple users. You can create up to 10 different profiles. At the first turning on of the balance, the **“Default”** user is enabled and this user cannot be either deleted or renamed.
Each user then can be fully customized including database and balance settings. Once you've created your profile, just touch on the user name area on the top of the main screen and select the desired user name. All settings for the selected user will then be loaded. From this moment on, any changes made to the current user logged in will be stored and made available each time the user will be selected.

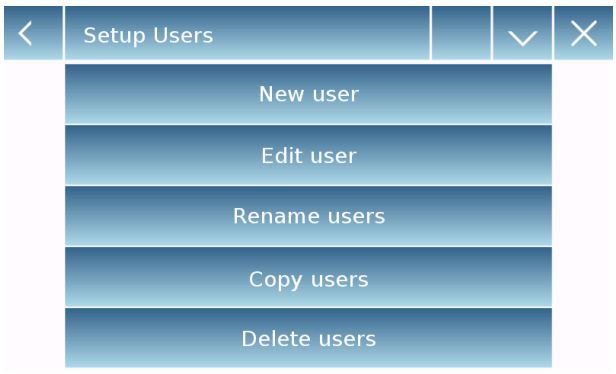
You can create two types of user:

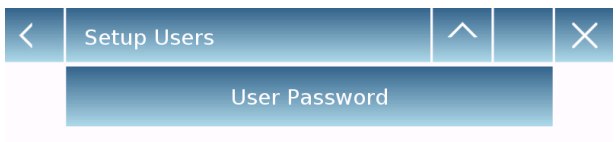
- **Administrator**
- **Standard**

Creating an administrator user allows accessing all the balance setting features and change or delete other existing users.
Creating a standard user allows to access only some of the balance setting features.
The “prohibition” symbol that appears when you touch a feature that is not available for the standard user is like this: 

You must log in with an administrator user to change the availability of protected functions.
Also, after you have created an administrator and standard user, you will be able to assign an access password that will be required each time you select the user or turn on the balance.

Below are all choices related to the user modification and deletion.
In the settings menu, select the "**Setup Users**"




This screen allows you entering the following functions:

- New user
- Edit user
- Rename user
- Copy users
- Delete user
- User Password

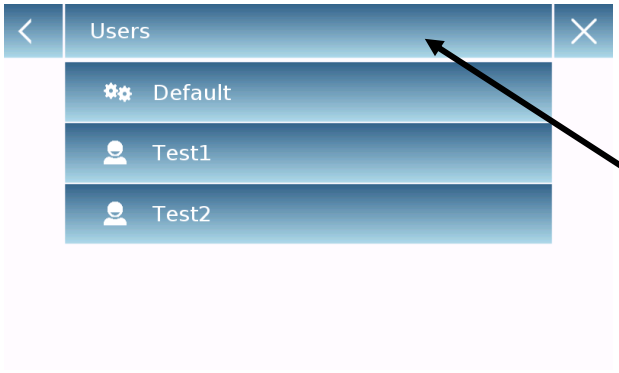

- **New user**

By selecting "New User", you can define a new user. The maximum number of users that can be entered is 10.
You will be prompted to select whether the user you want to create must have administrator rights or be a standard user.


The keyboard for entering the username will then be automatically activated.
The maximum number of characters allowed for the name is 30.

The insertion method distinguishes between uppercase and lowercase, so a user entered as "TEST" will be different from a user entered as a "test".

After a new user is created, go back to the main screen.

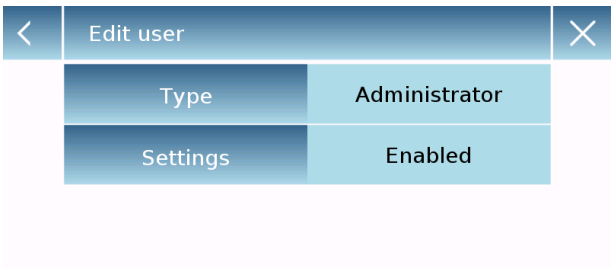



Touch the user selection area and select the user you have just created.
From now on, all changes to the functions, databases or weighing results will be associated with the user and each time it is selected they will be automatically reloaded.

The symbol on the left of the username indicates the type of user:

**Administrator**

**Standard**



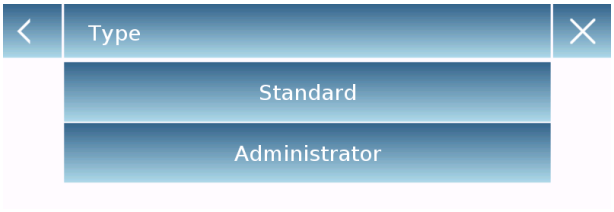

- **Edit user**

In the "Edit user " menu, you can change the user type ("Standard or Administrator") and temporarily unlock the standard user's locked settings.

Type

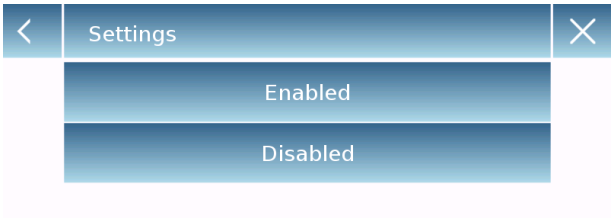
If the user is standard type in order to modify the user type, a password with administrator rights will be required.


Select **"Standard"** to set the user in standard mode or select **"Administrator"** to set the user with administrator rights.



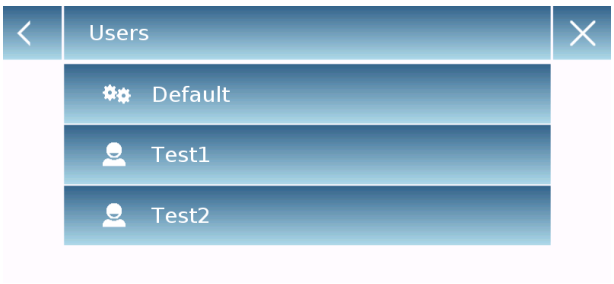

Settings

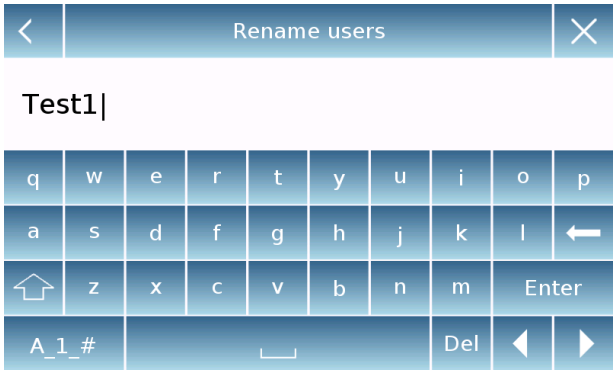
Selecting this function will prompt you to enter a user's password with administrator rights.




Then select "**Enable**" to temporarily unlock the standard user or select "**Disable**" to lock the user again.


After you unlock the user on the main screen on the left side of the username, an open padlock will appear.
Unlocking will remain active until it is locked again through the user editing menu, or when another user is selected or the balance is turned off.



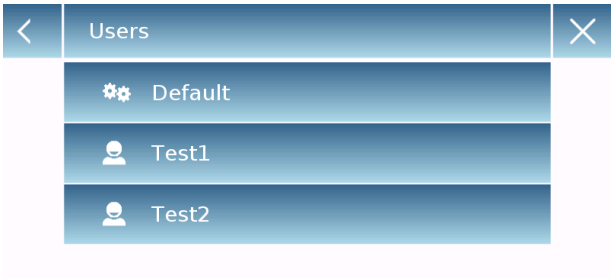




- **Rename users**

By selecting the "Rename Users" function, you can change the name of the selected user.

Select the user you want to rename.

The keyboard will appear.
Touch " **X** " if you want to abort the operation. Change the name and confirm with the "**Enter**" key.



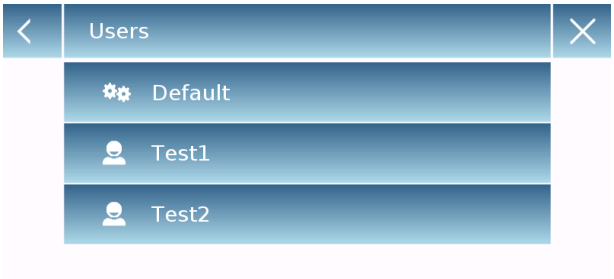


- **Copy users**

By selecting the "Copy Users" function, you can create a new user with the same configuration as an existing user.
Databases will not be copied and no password protection will be enabled. To copy the databases of another user, you need to export and import them to the desired user.

Select the user you want to duplicate.

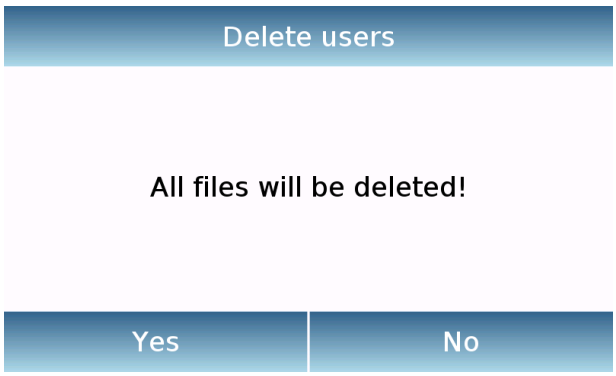
Enter the name to assign to the new user and confirm with the "**Enter**" key.



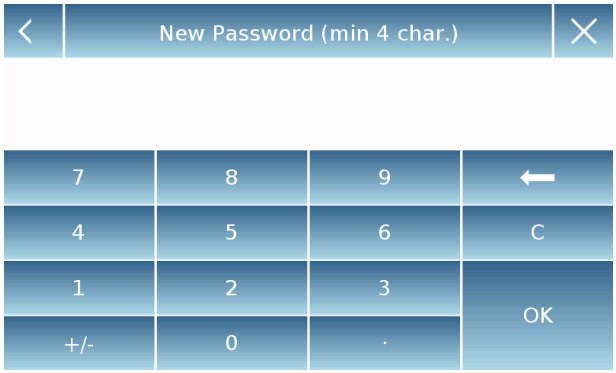

- **Delete users**

By selecting the "Delete Users" function, you can permanently delete a user and its databases.

The list of stored users will be displayed, then select the user to delete.

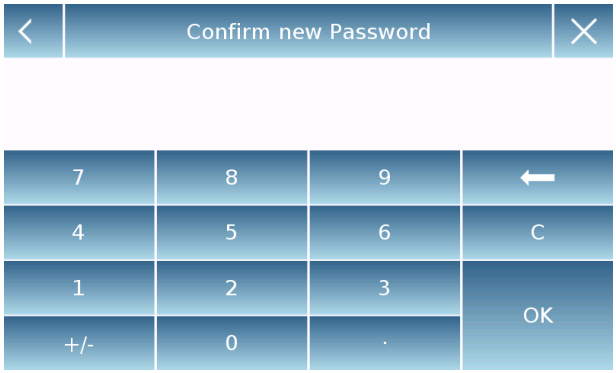



Confirm by touching the "**Yes**" key or cancel the operation by touching the "**No**" key.




- **User password**

By selecting the "User Password" function, you will be able to assign a "Standard" or "Administrator" user password.




You will then be asked to re-enter the password for confirmation.

Enter it and touch the "**OK**" key.

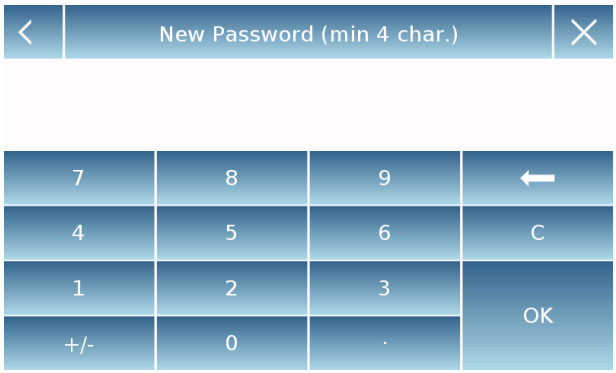
From this moment on, every time you want to access the user, you will be required to enter your password.

**N.B. Write down your password and store it in a safe place.**
**Warning! In case of loss, you will only be able to recover the password for the "Standard" user. The recovery procedure is described in chapter 8.3.1.**

### 7.3.1 Recovering and removing passwords

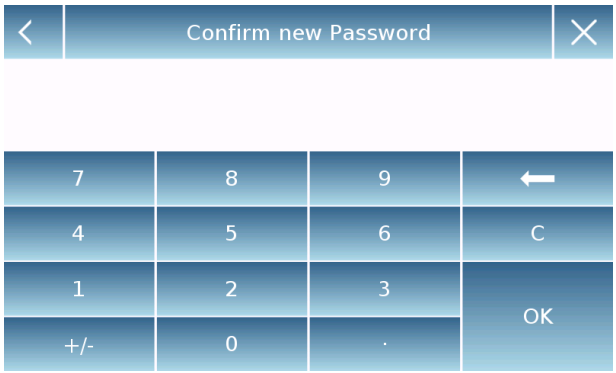
User password protection is applicable to both "Standard" and "Administrator" users. In the first case, if the user forgets its password, you can update it from the "**User Password**" menu.


After selecting "User Password", you will be asked to enter the "**Old Password**".
Enter an administrator password.




Then enter the "**New password**" to assign to the user.

Confirm the password you have just entered.




From now on, the "Standard" user will have a new login password.

**N.B.**
**To remove the password, upon the request for entering the new password and confirmation of the new password, touch the "OK" key without typing anything.**

**CAUTION! If you lose the administrator password, you will need to contact a Service Center to retrieve it.**

## 7.4 Preferences: language, display appearance, brightness, beeper

For each user, you can set a graphic style, the system language, activation or not of the beeper and the brightness of the display. Below are the options available and how to activate.

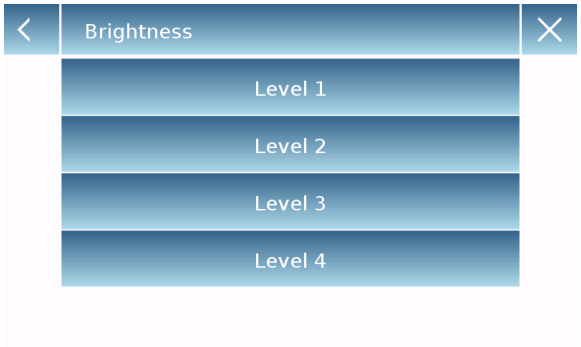
In the settings menu, select the "**Preferences**" function.


The parameters that can be set in the "**Preferences**" menu are as follows:

- Language (see chapter 7.1)
- Appearance
- Brightness
- Beeper
- Functions

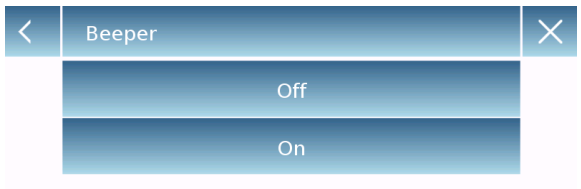

Appearance

You can choose between 6 different color combinations and select the desired one by touching the corresponding key

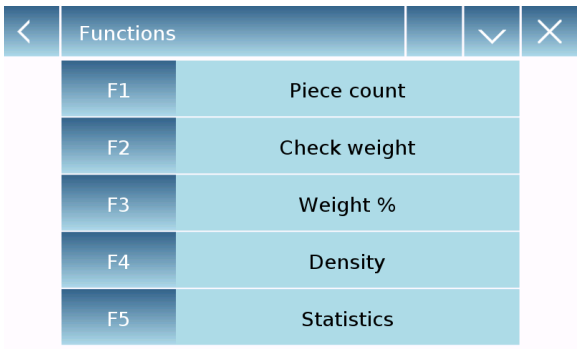

Brightness

There are 4 levels of brightness on the display. Select the desired one by touching the corresponding key.




**Beeper**

The beeper function allows you to activate or deactivate the beeper. When activated whenever you touch the active area of the touch screen, a beep can be heard.





## Functions

You can decide which functions to make available and on which sequence to show them for each user logged in.

The sequence of the functions in the relevant screen corresponds to the sequence assigned to function keys from F1 to F10


To assign a function, touch the key you want to assign and select one from the list of available functions.

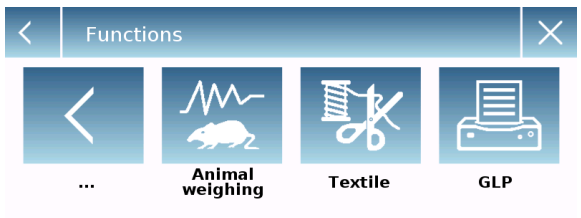
To remove a function, touch the key corresponding to the function you want to remove and select "**None**" from the list.


From the main weighing screen, touch  to access the functions menu.

To switch to the next or previous screen touch the keys:

 Next

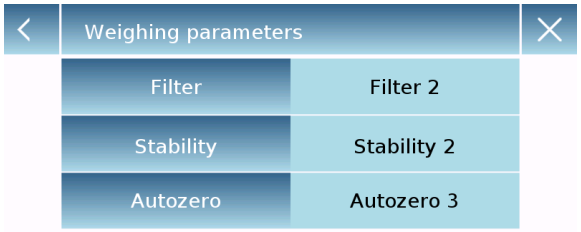
 Back



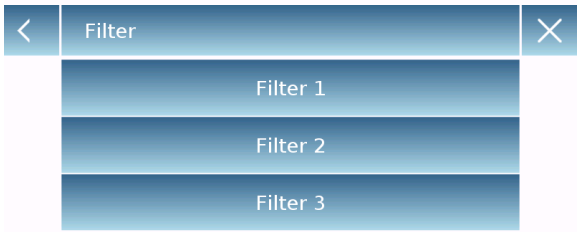
## 7.5 Setting the weighing parameters

For proper use of the balance, it is important to set the correct weighing parameter according to the operating environment.
This section describes the filter parameters, stability, autozero and weighing units.

In the settings menu, select the "**Setup**" function and then the "**Weighing parameters**" function.




In the "**Weighing parameters**" screen the set values (in the box to the right of the parameter) are immediately verifiable.
By touching the parameter key you want to change you will able to change it.




- **Filter:** the filter function allows speeding up or slowing down the balance response according to weighing requirements and environmental conditions. By selecting Filter 1, the response will be immediate, but the balance will remain more sensitive to environmental disturbances such as ventilation and vibration. By increasing the level, the response will be slower and the indication more stable.

  - **Filter 1:** dosage conditions
  - **Filter 2:** stable conditions
  - **Filter 3:** unstable conditions


- **Stability:** this function allows you to adapt the balance to the working environment. When using the balance in a vibration-free environment, select level 0. The default level is 2. Use level 3 for very disturbed environments.

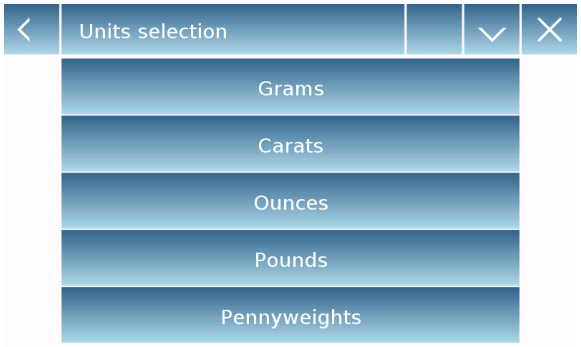
  - **Stability 0:** stable environments
  - **Stability 1:** poorly stable environments
  - **Stability 2:** unstable environments
  - **Stability 3:** very unstable environments


- **Autozero:** automatic zero correction constantly adjusts the zero value. These variations may be caused, for example, by some dirt that can be deposited on the plate. You can disable this function by selecting **"Off"** mode. Level 1 is the one with the minor correction and level 3E which is the maximum correction.

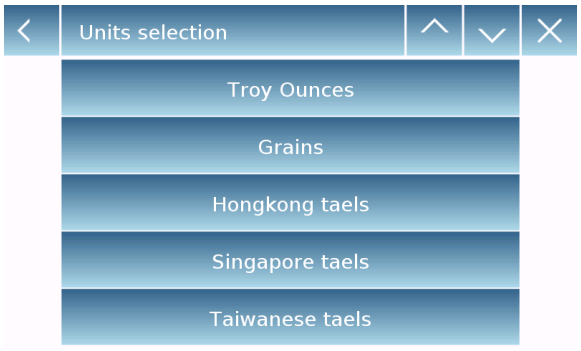
## 7.6 Selecting the unit of measurement

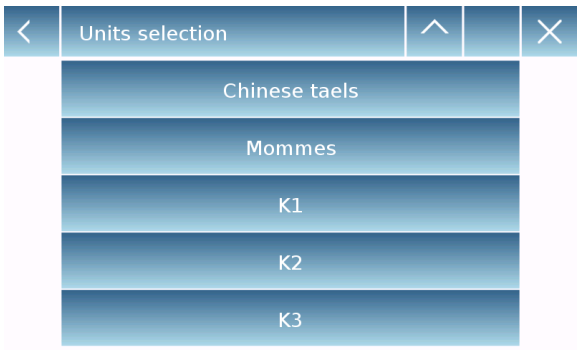
Weighing operations can be performed with different units of measurement. Below is shown how to select the desired weighing unit.

In the settings menu, select the "**Setup**" function and then the "**Units selection**" function.




On the "**Units Selection**" screen, all available weighing units are immediately displayed. Touch the desired unit to enable it.



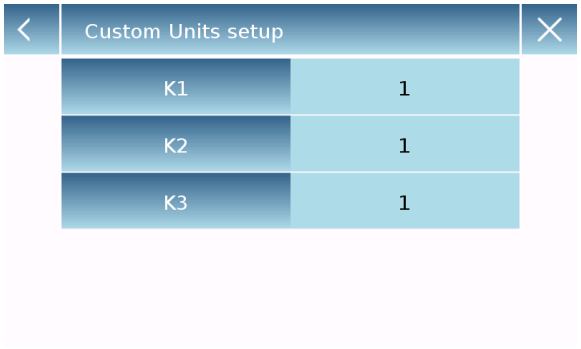

The last three units of measure **K1, K2, K3**, are customizable units. Refer to the chapter 8.7 for more informations.

**N.B.: The measurement unit selection can also be made directly from the main weighing screen; by touching the symbol of the current unit displayed, you will have access directly to the list of available units.**

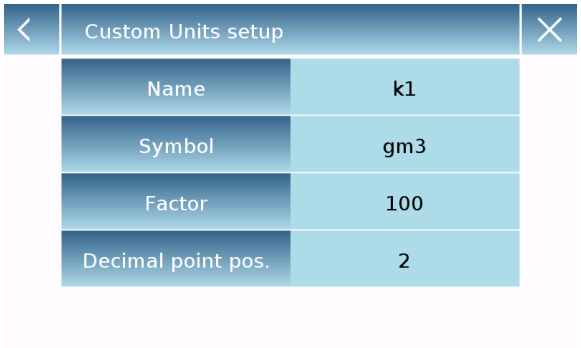
## 7.7 Selecting the custom measurement units

You can define up to three custom units per user. This allows you to perform different kind of calculations directly from the weighing acquisition (i.e. volume, paper grammage g/m3). The custom weight unit can be recalled in all areas and menus where units can be selected.

In the settings, select “**Setup**" and then the "**Custom units setup**".




On the **“Custom units setup”** screen, you can select one of the three units K1, K2, K3 available to customize it.



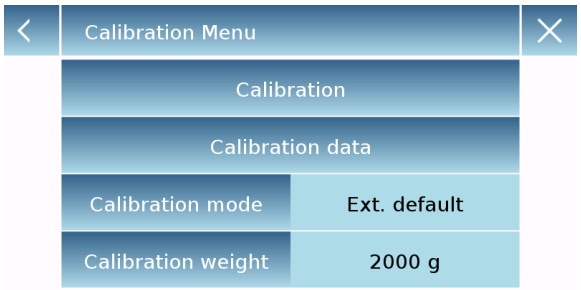

After the selection, enter the following data:

- **Name:** enter the unit identifier (max 15 characters).
- **Symbol:** enter the symbol you want to assign to the unit of measurement (max. 3 characters). The weighing units g, kg, lb and so on are not allowed
- **Multiplier factor:** enter the multiplicative factor with which the weighing result has to be calculated
- **Decimal point position:** enter the position of the decimal point with which you want to display the result (i.e. entering 1, the value 123,123 will be displayed as follows: 12312,3)

## 7.8 Calibrating and setting the calibration mode

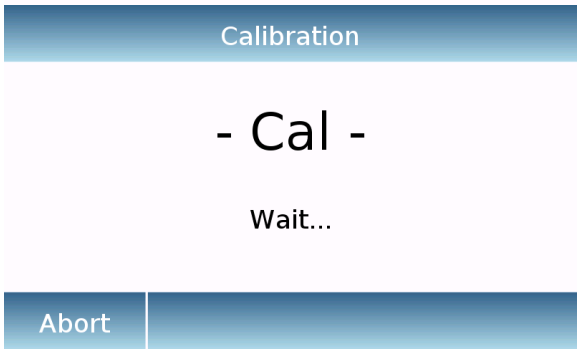
The electronic balance performs mass measurements using gravity. Differences in geographic regions and altitude vary the gravity acceleration (g).
Therefore, in order to obtain accurate measurements, the balance must be adapted to the place of use and environmental conditions. This adjustment is performed by the calibration function.

Select the "**Calibration menu**" function in the settings menu.

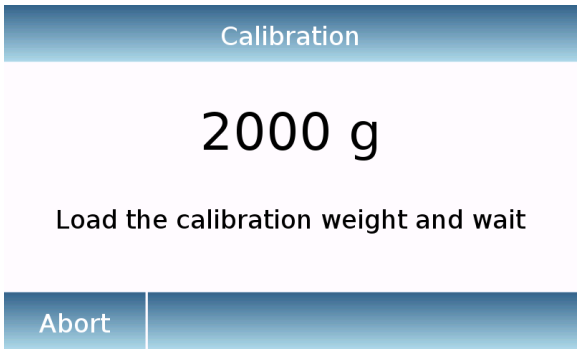



In the calibration menu, you can calibrate, display and print the data for the last calibration and set the calibration mode.

Before performing the calibration procedure, check that the plate is empty.




- **Calibration:** By touching the calibration key, the calibration procedure corresponding to the set calibration mode will be activated.

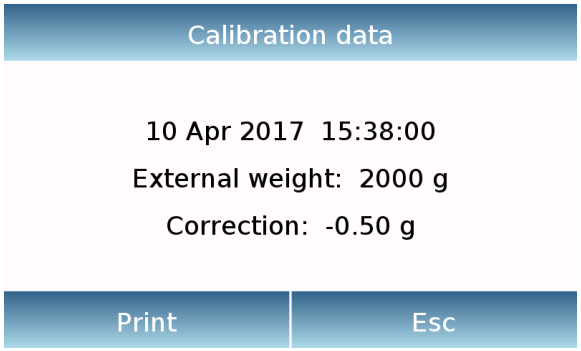



Load the required calibration weight or touch the "**Abort**" key to cancel the calibration procedure.

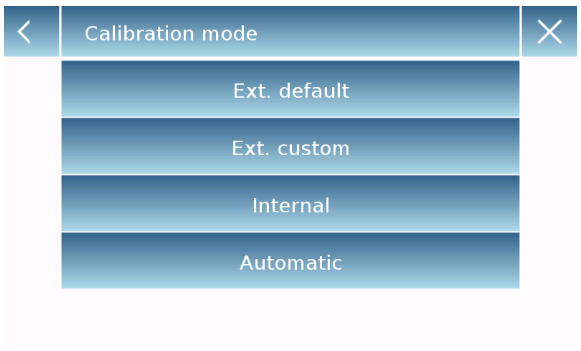

Wait for the weight value to be acquired.

If the operation is successful, the weighing screen will display the weight value of calibration weight.

Remove the weight from the plate.



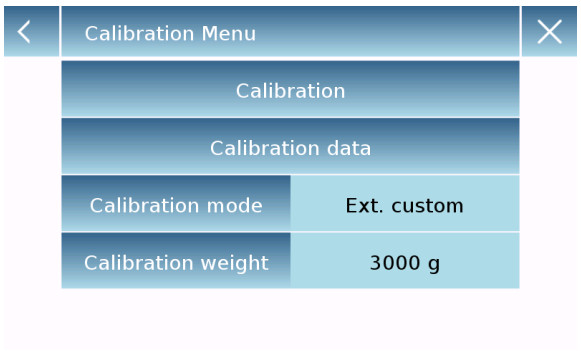

- **Calibration date:** in the calibration data screen, you can check the date when the last calibration was performed, the mode with which it was performed, the weight value used, and the correction made comparing the previous calibration. By touching the "**Print**" key, you can print the displayed data.



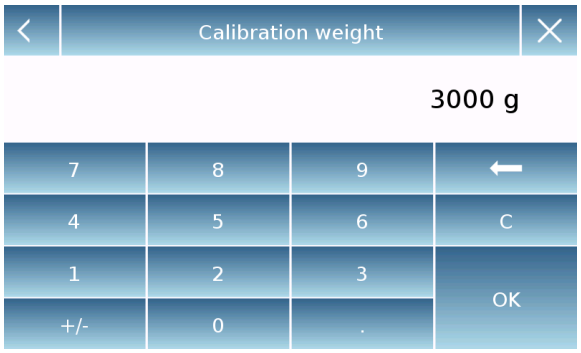

- **Calibration mode:** the balance can be set to calibrate with two different modes:

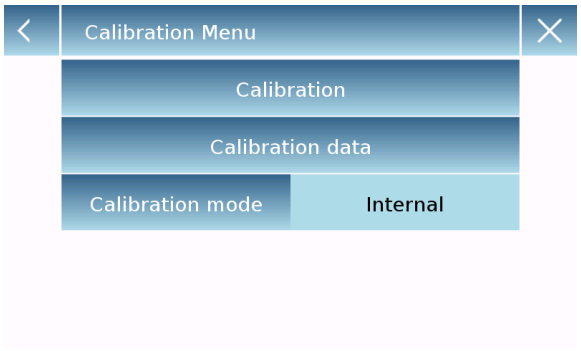
**External default**
By selecting the default calibration mode when the calibration command is given, the required weight will be the factory default setting, the value of which will vary depending on the balance model.

**External custom**
By selecting the external custom calibration mode, you can set a custom calibration weight value.



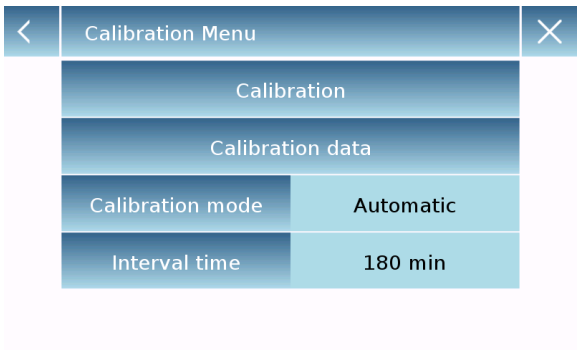

After selecting the "External custom", touch the weight setting key to set the desired weight value.





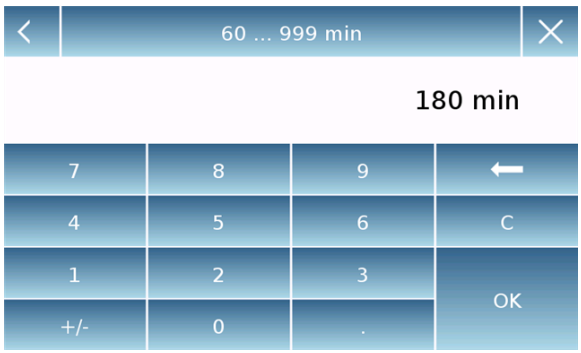

**Internal***

By selecting the internal calibration mode when the calibration command is given, the balance is automatically calibrated through the auto-calibration internal system.




**Automatic***

By selecting the automatic calibration mode, the balance automatically calibrates using the internal system each time a change in the environment temperature significant enough to affect accuracy occurs and/or within a set time from 60 to 999 minutes. Also with this mode, you can calibrate each time you want by touching the "Calibration" key.



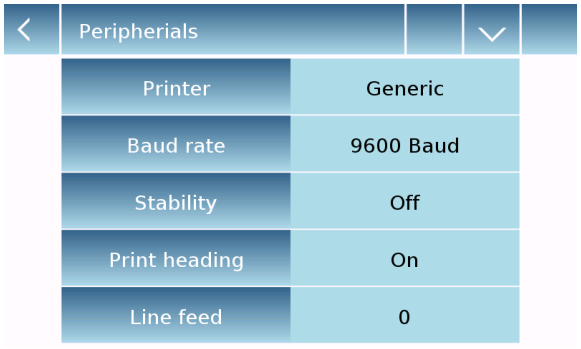

To change the auto-calibration range, touch the "**Interval time**" key and set the desired range between 60 and 999 minutes.

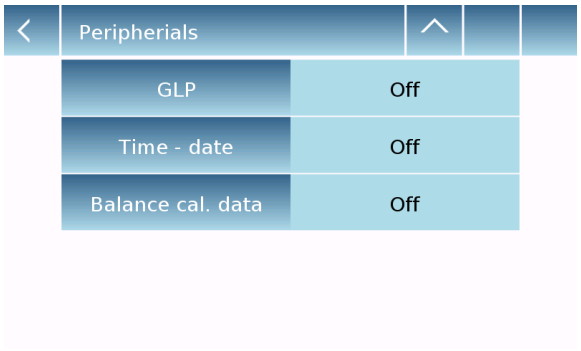
*** The internal and automatic calibration mode is only available for auto-calibration models.**

## 7.9 Setting the peripherals

This section describes the features and settings of the RS232 and USB outputs of the balance.

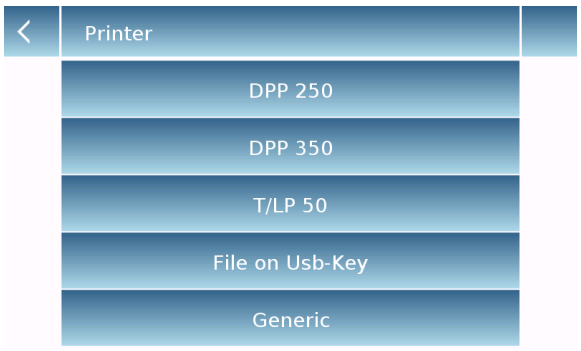
In the setting menu, select "**Setup**" and then "**Peripherals**".



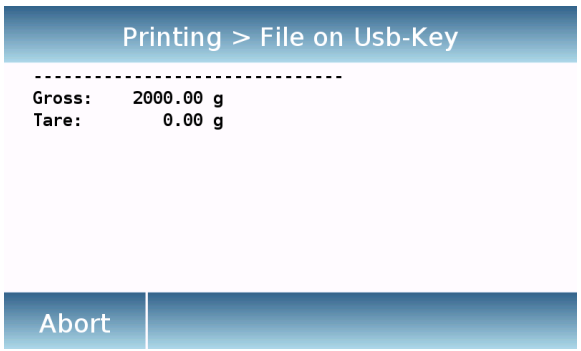

In the "**Peripherals**" menu screen, you can immediately check the values of the parameters currently set (in the box on the right of the parameter).

Touching the parameter key to be set will activate its screen with the list of the various selectable options.

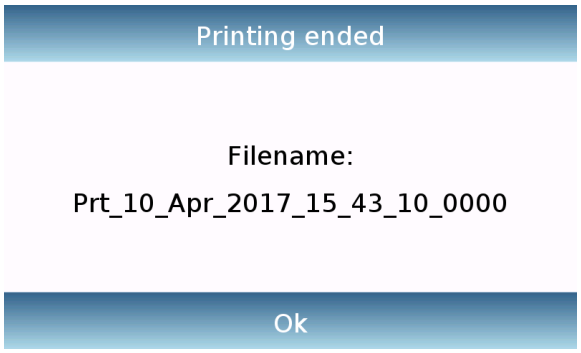




- **Printer:** allows you to select the peripheral to connect to the serial output.
  - **Dpp250:** command print by touching the "**Print**" key. For the Dpp250 printer.
  - **Dpp350:** command print by touching the "**Print**" key. For the Dpp350 printer.
  - **Tlp50:** command print by touching the "**Print**" key. For the Tlp50 printer.
  - **Generic:** command print by touching the "**Print**" key. For generic serial type printer.




➢ **File on Usb-Key:** command print by touching the "**Print**" key will print to a file. In order to use this mode, you will need a USB pen to save the files.
With the "File on Usb_Key" mode enabled, before executing the print command verify that the USB pen is inserted in the USB port on the left side of the balance.
While saving the file you can scroll on the screen through the information that will be saved in the file.




After the data are saved, the name of the file assigned automatically will appear on the screen.

The USB pen will then contain a compressed file with a text file (.txt) showing the weighing data or the result of the function used.

---
Liquid density:
1.0 g/cm3

Air P.: 200.04 g

Liq. P.: 100.02 g

Result (Solid Dens.):
2.0000 g/cm3
---

Example of printing with density function.

←

➢ **PC:** touching the "**PC**" key for PC connection.

## PC Communication protocol

**'T'** = Tare (only available if the corresponding key is on screen)

**'Z'** = Zero (only available if the corresponding key is on screen)

**'N'** = Net weight (available in all screen)
Answer: " -100.000 g S net <CR><LF>"
Answer: "HHHHHHHHHHHHHH g S net <CR><LF>" (over range)
Answer: " LLLLLLLLLLLLL g S net <CR><LF>" (under range)

**‘G’** = Gross weight (available in all screen)
Answer: "  -100.000 g  S gro <CR><LF>"
Answer: "HHHHHHHHHHHHHH g  S net <CR><LF>" (over range)
Answer: "  LLLLLLLLLLLLL g  S net <CR><LF>" (under range)

**‘P’** = available if the "Print" key is on screen.
See list below

No other commands are available through RS232.

String format:

Characters 1...14 = Weight or other data (the minus sign is before the first most significant digit) (if over or under range H...H or L...L )
Characters 15 = Space
Characters 16...20 = Weight unit
Characters 21 = Space
Characters 22 = 'S' if weight is stable otherwise Space
Characters 23 = Space
Characters 24...27 = Mode
Characters 28 = <CR>
Characters 29 = <LF>

**1 - Main weight screen:**
Commands: 'T', 'Z', 'N', 'G' as described above.
'P' print the following rows:
"  0.000 g  S gro <CR><LF>"
"  100.000 g  S tare<CR><LF>"
"  -100.000 g  S net <CR><LF>"

**2 – Parts counting:**
Commands: 'T', 'Z', 'N', 'G' as described above.
'P' print the following rows:
"  1000 pcs  S pcs <CR><LF>"
"  1.000 g  S mpw <CR><LF>"
"  0.000 g  S gro <CR><LF>"
"  100.000 g  S tare<CR><LF>"
"  -100.000 g  S net <CR><LF>"

If statistic function is enabled 'P' has no effect.

**3 – Checkweighing:**
Commands: 'T', 'Z', 'N', 'G' as described above.
'P' print the following rows:
"  10.000 g  S low <CR><LF>"
"  20.000 g  S high<CR><LF>"
"  S ok  <CR><LF>" (ko--) (ko++)
"  0.000 g  S gro <CR><LF>"
"  100.000 g  S tare<CR><LF>"
"  -100.000 g  S net <CR><LF>"

**4 – Percentage:**

Commands: 'T', 'Z', 'N', 'G' as described above.
'P' print the following rows:
"  10.000 g  S ref <CR><LF>"
"  100.0 %  S per <CR><LF>"
"  0.000 g  S gro <CR><LF>"
"  100.000 g  S tare<CR><LF>"
"  -100.000 g  S net <CR><LF>"

If statistic function is enabled 'P' has no effect.

**5 – Density:**
Commands: 'T', 'Z', 'N', 'G' as described above.
'P' print the following rows:
"  1.00000 g/cm3 S den <CR><LF>"

In case of density index
'P' print the following rows:
"  1.00 %  S ind <CR><LF>"

**6 – Formulation:**
'P' has no effect.

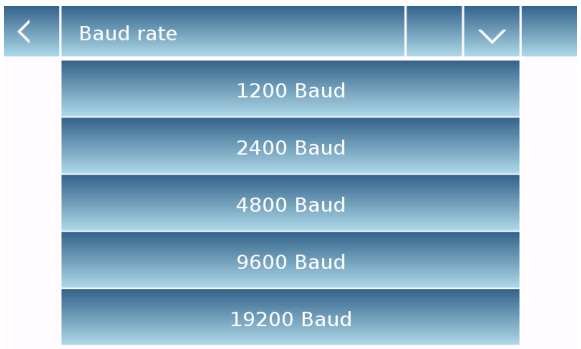
**7 – Statistics:**
'P' has no effect.

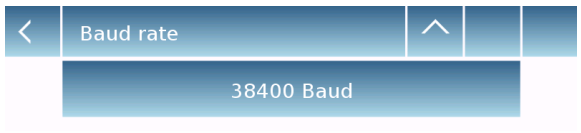
**8 – Peak hold:**
Commands: 'T', 'Z', 'N', 'G' as described above.
'P' print the following rows:
"  10.000 g  S max <CR><LF>"

**9 – Dynamic Animal:**
Commands: 'T', 'Z', 'N', 'G' as described above.
'P' print the following rows:
"  10 s  S time<CR><LF>"
"  0.000 g  S avg <CR><LF>"

**10 – Textile:**
Commands: 'T', 'Z', 'N', 'G' as described above.
'P' print the following rows:
"  100 m  S len <CR><LF>"
"  100.0 tex  S tit <CR><LF>"
"  0.000 g  S gro <CR><LF>"
"  100.000 g  S tare<CR><LF>"
"  -100.000 g  S net <CR><LF>"

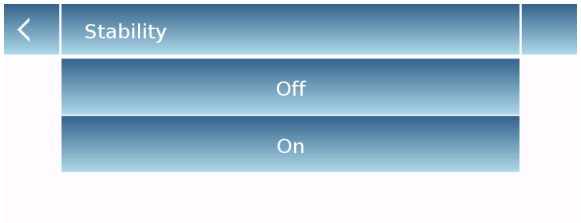
If statistic function is enabled 'P' has no effect.



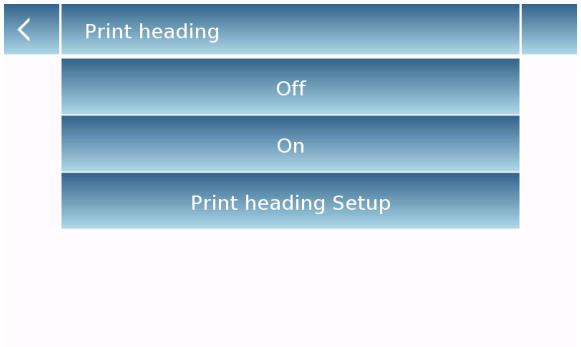

- **Baud Rate:** serial transmission speed selection parameter.
  Selectable speeds are:

  ➢ **1200 Baud**.
  ➢ **2400 Baud**.
  ➢ **4800 Baud**.
  ➢ **9600 Baud**.
  ➢ **19200 Baud**.
  ➢ **38400 Baud**.



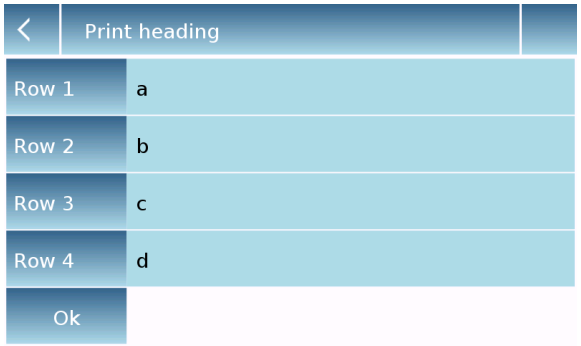

- **Stability:** check of the stability before data is transmitted. It is possible to decide whether to enable or disable stability control before printing the weight value:

  ➢ **On**. Check enabled.
  ➢ **Off**. Check disabled.



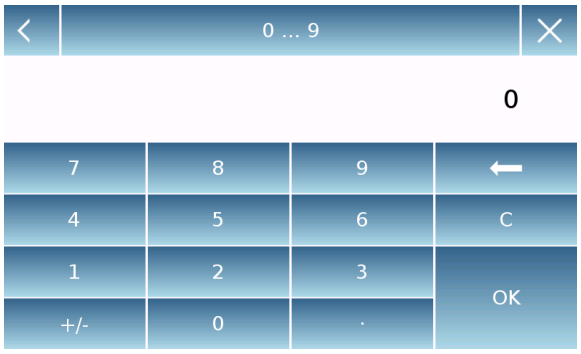

- **Print heading:** allows you to place a header at the beginning of the receipt. The function can be:

  ➢ **On**. header enabled.
  ➢ **Off**. header disabled.
  ➢ **Print heading Setup:** allows you to input the desired text for the receipt header.

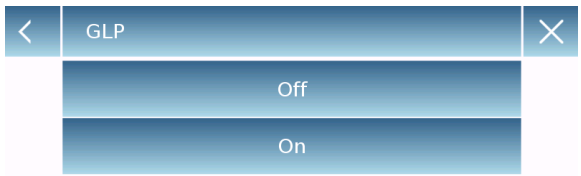



In the print heading screen, touch the areas that indicate the row number to automatically enable the alphanumeric keypad and enter the desired text with a maximum number of 40 characters per line.
Touch the "**Ok**" key to confirm the input text.

**NB.** You can enable and disable the header function without losing the entered text, which will remain stored until the contents of the various rows are deleted.



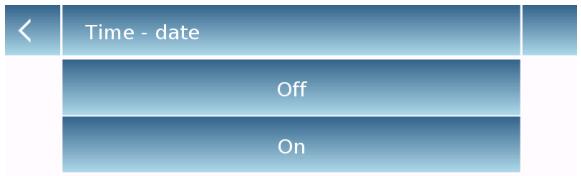

- **Line feed:** allows you to set a blank number of lines to add at the end of the receipt to be printed.
  The numeric keypad will automatically turn on, so enter the desired number of lines (between 0 and 9) and touch the "**Ok**" key to confirm the entered number.




- **GLP:** allows you to enable or disable the GLP data printing.

  ➢ **On**. GLP data print enabled.
  ➢ **Off**. GLP data print disabled.

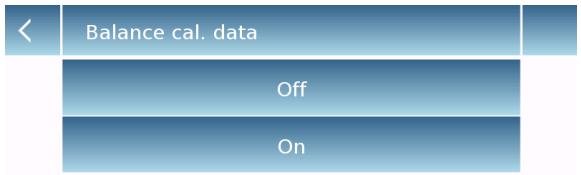
For information entry and GLP database management, see **chapter 9.9**




- **Time and date:** allows you to enable or disable the time and date printing.

  ➢ **On**. Time and date print enabled.
  ➢ **Off**. Time and date print enabled disabled.

Time and date printing cannot be deactivated with the GLP function enabled.



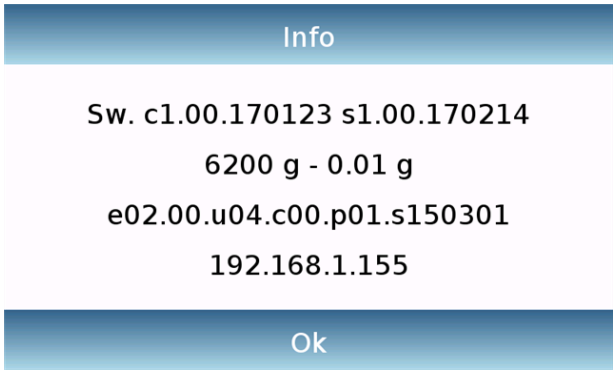

- **Balance cal. data:** allows you to enable or disable the calibration data printing of the balance.

  ➢ **On**. Calibration data print enabled.
  ➢ **Off**. Calibration data print disabled.

## 7.10 Info about the software

This section explains how to check information about the software release of the balance.

In the settings menu select "**Setup**" then "**Info**" .

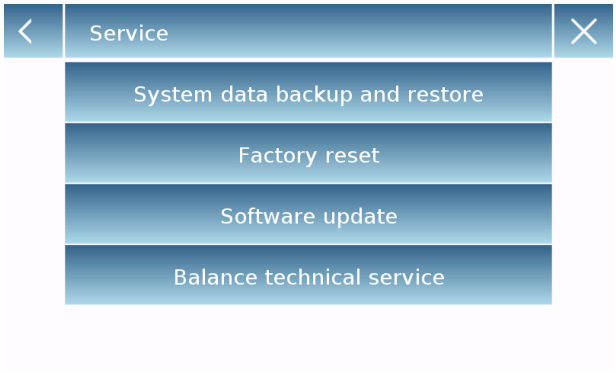



The information on the Info screen will be requested by the technical staff in case of service request.

## 7.11 Service

This section describes all the functions related to the Service and Backups of the balance data.

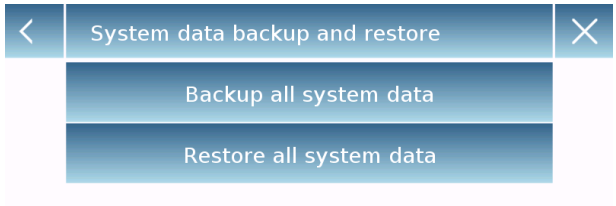
In the settings menu select the "**Setup**" then "**Service**".




The functions available in the **Service** menu are:

- System data backup and restore
- Factory reset
- Software update
- Balance technical service

### 7.11.1 System data backup and restore




You can back up the system completely or restore data and configuration previously saved on a USB pen.
This section describes the steps to be taken to export or import the data.

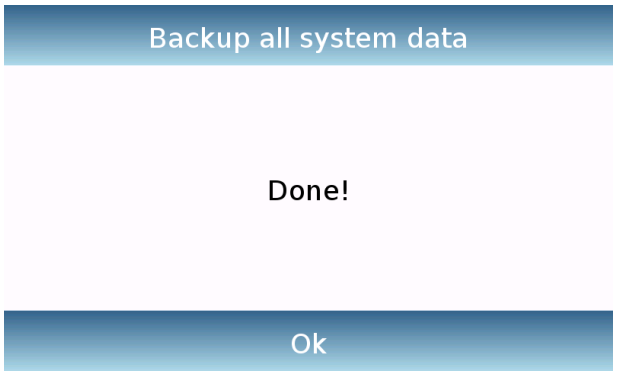
**N.B.** It is recommended to use an empty USB pen that is dedicated to data save and recovery operations.


- **System backup:** this command allows you to save all users and their configurations stored in the system, including its database and saved test results.

You must have a USB pen to back up.

Insert the USB pen into the USB port on the left side of the balance, and touch the "OK" key.
Touch the "Abort" key to cancel the backup operation.

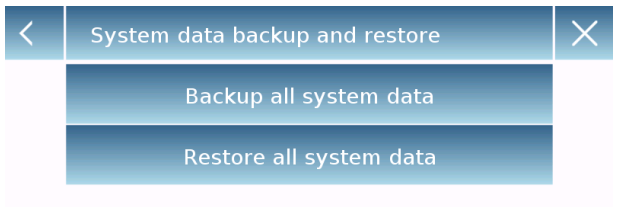

If the USB pen is inserted correctly, after confirmation, the alphanumeric keypad will automatically be displayed for entering the name that you want to assign to the backup.




A screen with the message "Done!" will report that the export operation was successful.

A backup folder with the assigned name is then created in the USB pen.

Opening the folder, you will find a set of files and subfolders that contain all the data.
N.B: Do not modify or rename any files to avoid damaging the content.

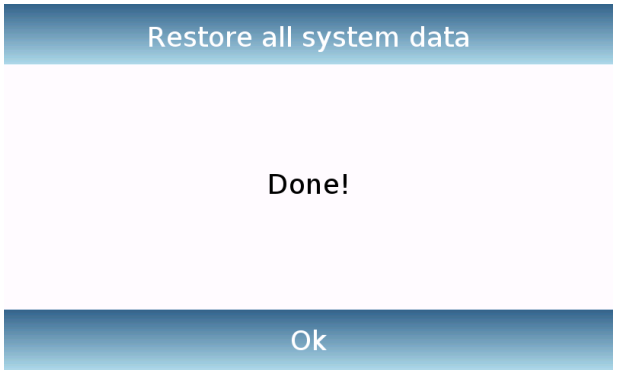



This folder will be automatically restored to the balance by using the System Restore command.

- **System restore:** this command allows you to restore all users and their system configurations previously exported with the backup command on a USB pen.
  N.B. You can import the exported data from another balance of the same kind, so you can configure multiple balances with the same users and the same settings.


Insert the USB pen into the USB port on the left side of the balance, and press the "OK" key.
Touch the "Abort" key to cancel the system restore operation.


If the USB pen is inserted correctly, after confirmation, the alphanumeric keypad will automatically be displayed for entering the name of the backup you want to restore.




A screen with the message "Done!" will report that the system recovery operation was successful.

### 7.11.2 Factory reset

You can perform a total reset of the balance to bring it back to the initial factory conditions.

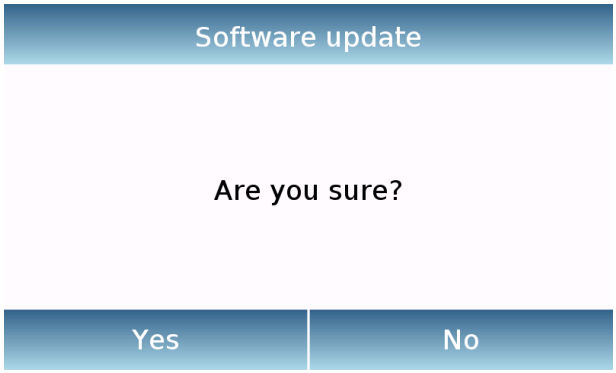
Touch the "**Factory Reset**" key, confirm by touching the "Yes" key, or abort the operation by touching the "No" key.

**N.B. Be careful as all the data of all users including their databases will be lost. If you want to save them, make a backup before the factory reset.**

### 7.11.3 Software update

You can make any software updates provided by the manufacturer via the USB port.

Below are the steps to be taken to update the system.




Selecting "Software Update" it will displayed the screen with the confirmation request.
Select "**No**" to cancel the operation, or "**Yes**" to continue.


Insert the USB pen into the port on the left side of the balance. Be sure that in the pen drive is present the update supplied by the manufacturer and confirm with the "**Ok**" key.

If the selected file is correct, the update operation will be enabled and a counter will indicate the progress status.

**N.B. Once the software update operation has begun, do not power off the balance until the operation completes.**
**During the upgrade, the balance will turn off and restart automatically; do not press any key, but wait for the operation to be finished successfully.**

### 7.11.4 Balance technical service

The technical service function of the balance can be accessed by password only by the authorized technician.

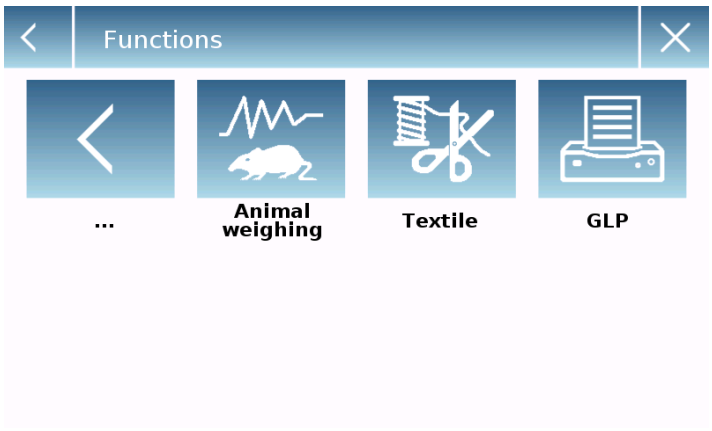
# 8 Functions menu

This section describes all the functions available for weighing. All of the features described below are customizable in their databases for each user; they can be enabled, disabled, and sequenced according to its usage needs. Each time you change the user, its function settings will vary.

Touch the key  , to access the functions menu.

Use the keys  ,  to scroll through the pages.

Touch the icon corresponding to the function you want to access.

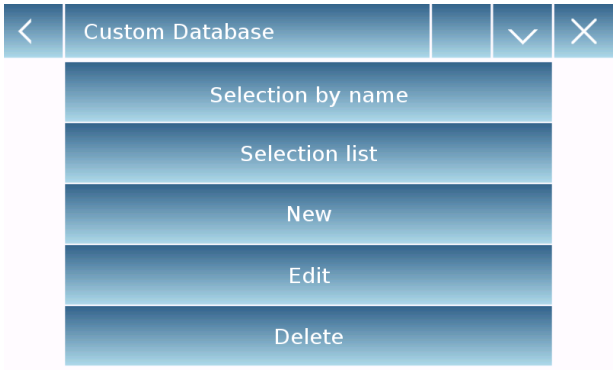



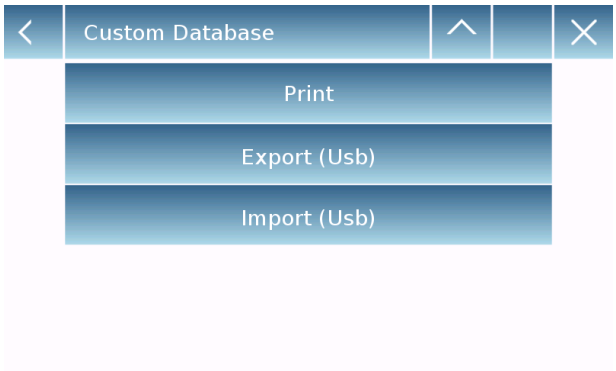

To exit the functions menu, touch the key  or  .

## 8.1 Using the database

All functions can be customized for each user by storing the desired modes and data through the relevant database.
The following are the search, save, delete, and editing functions common for all databases. For entering data in the database, refer to the paragraph corresponding to the desired function.

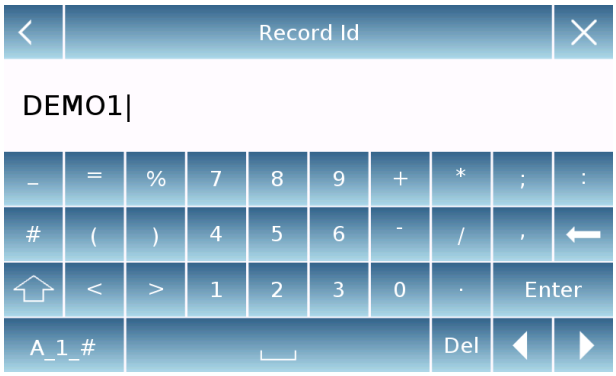
After selecting the desired function, touch the "**Database**" key to access its database.




Every time a new user is created its database will be empty. Following all the functions available for all databases:

- **Selection by name:** by touching this key you can call up an item by entering the corresponding name.
- **Selection list:** by touching this key you can call up an item by selecting it from a list.
- **New:** insert new record (refer to the paragraph corresponding to the desired function).
- **Edit:** by touching this key, you can access the editable parameters of the function.
- **Delete:** touch this key to delete one or more previously stored records.
- **Print:** by touching this key, you can select a record and print it.
- **Export (Usb):** by touching this key you can export the database to the USB pen.
- **Import (Usb):** by touching this key, you can import a previously predefined database from a USB pen.



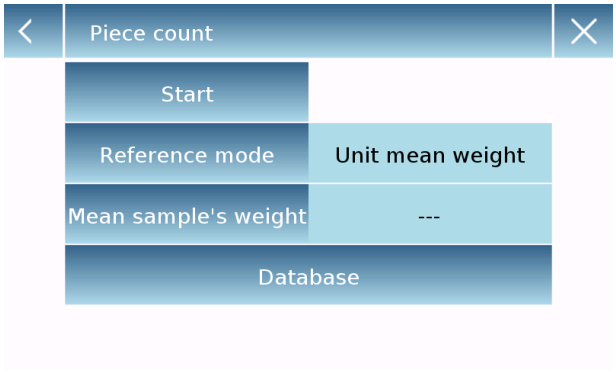

Use the keyboard to enter the name to assign to the new record.
The maximum number of characters that can be entered is 30.

Touch the "**Enter**" key to confirm.

## 8.2 Piece counting

The pieces counting function allows you to count the pieces through sampling with a certain number of pieces or by inputting the average weight value of the pieces to be counted.

From the "Functions" screen touch the "**Piece count**" icon.




Parameters entry

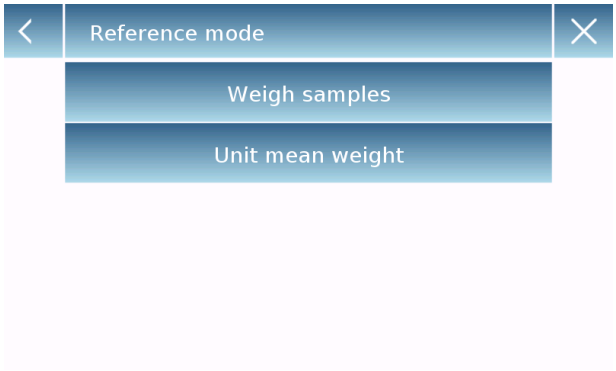
**Reference Mode**
By touching this key, you can select the counting mode:

- **Weigh samples**.

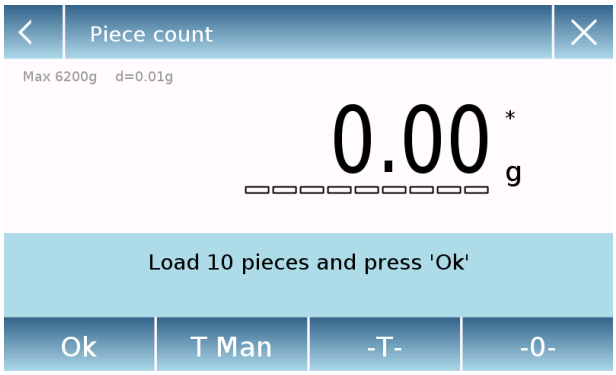
Counting by sampling a certain number of pieces. Enter the number of samples you want to use for the count by touching the "Number of samples" key.

- **Unit mean weight**.

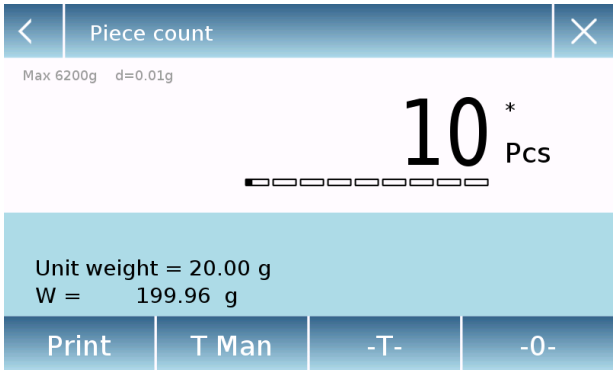
Count by entering the weight value of the single piece to be counted. Enter the weight value by touching the key "Unit mean weight"

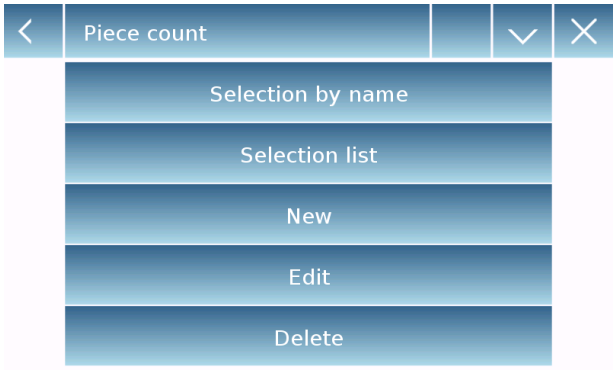



**Start:**
After selecting the count mode, touch the "Start" key to perform the count of the pieces.

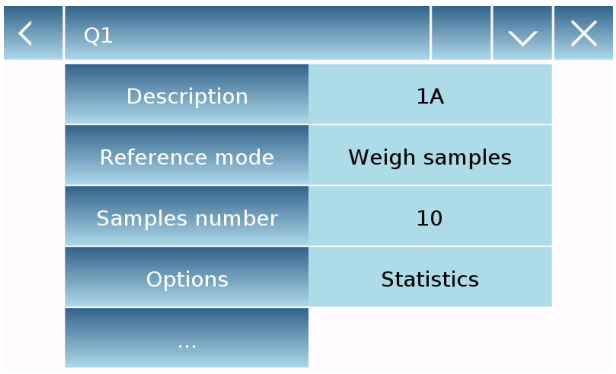



Do the tare of the container if necessary. In the case of sample counting, before counting it will be required to load the number of pieces chosen (for sampling) on the plate, while in the mode with average unit weight, you can start directly to count the pieces.

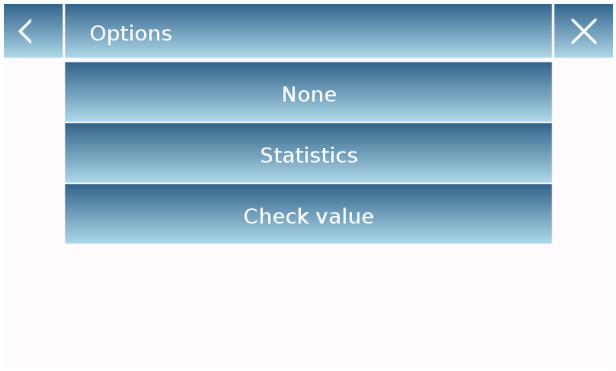


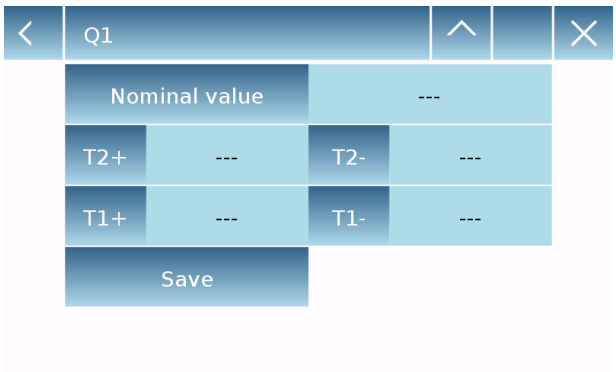



**Database:**
By touching the "Database" key, you can create a custom counting database of different items with different methodologies.
By using the database, in addition to the standard piece counting, you can perform statistical count control and use up to two threshold levels for packing control.
Touch the "**New**" key and enter the name of the new record to be stored.



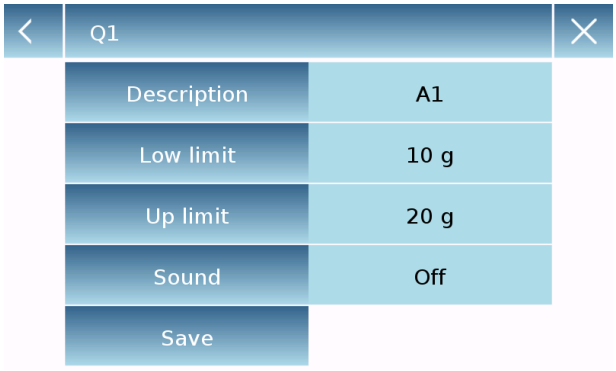

- **Description:** enter a description of the item.
- **Reference Mode:** select the count mode.
- **Samples number/ Unit mean weight:** enter the number of samples or the average unit weight of the pieces.
- **Options:** you can select the statistical control by activating the "Statistics" function or by controlling the pieces by activating the "Check value" function.




**Statistics:**
To enable this function, you need to include:

- **Nominal value:** enter the nominal value of the number of pieces to be counted.
- **T2+, T2-, T1+, T1-:** enter the error tolerance threshold values. (Optional entry).
- **Save:** touch the "Save" key to store the recorded record.

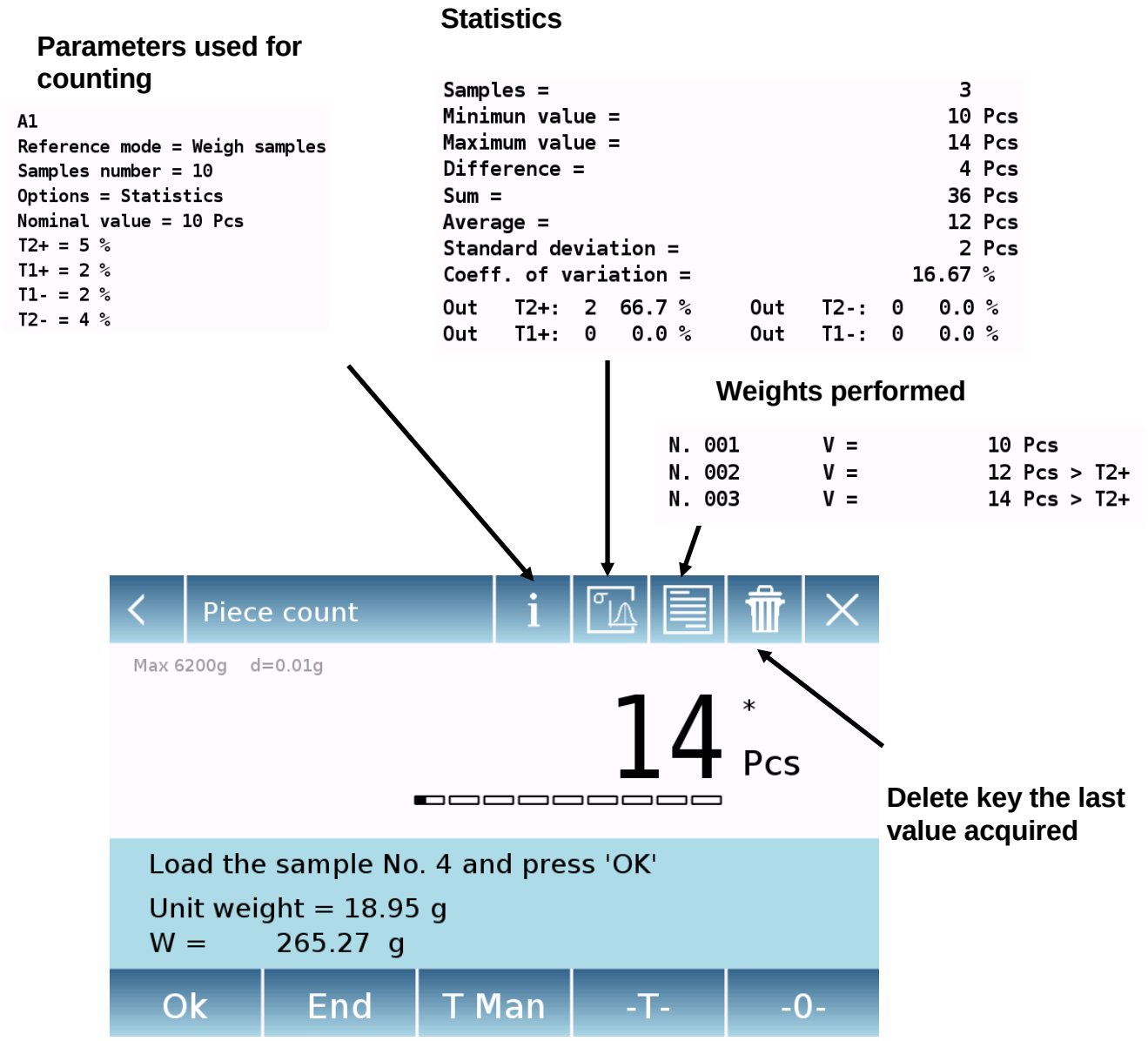



**Check weight:**
To enable this function, you need to enter:

- **Low limit:** enter the minimum acceptable number of pieces.
- **Up limit**: enter the maximum acceptable number of pieces.
- **Sound:** you can activate or deactivate the beeper when the number of pieces is inside the set range.
- **Save:** touch the "Save" key to store the entries

### 8.2.1 Pieces counting screen with “Statistics” function.

The following describes the pieces counting functions with statistical calculation.

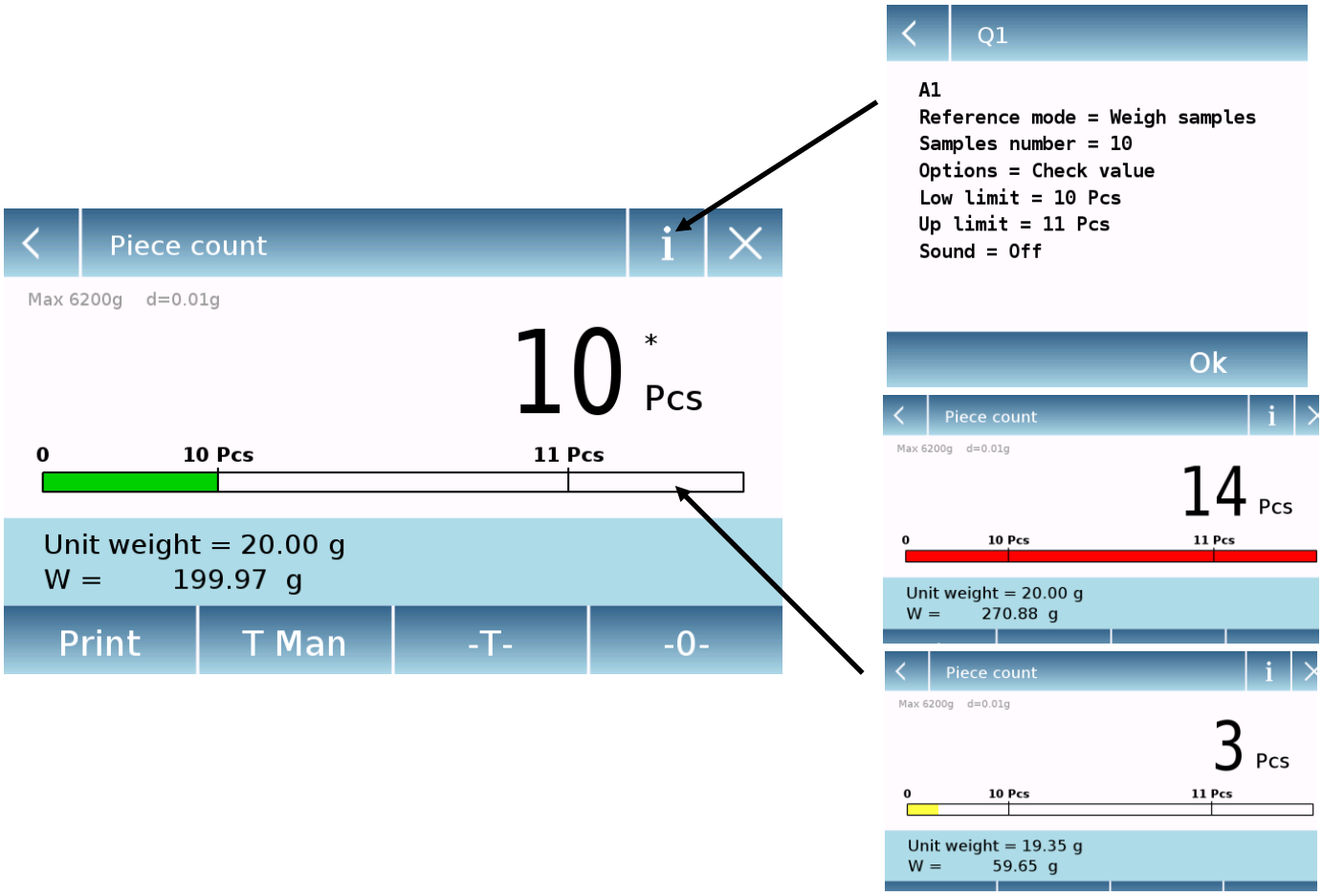



Touch the "**Ok**" key to acquire a new weight and touch the "End" key to end the acquiring and perform the final statistical calculation.

### 8.2.2 Pieces count screen with “Check weight” function.

The following describes the pieces counting functions with check weight.

By touching the "i" key you can see the parameters used for counting the pieces.



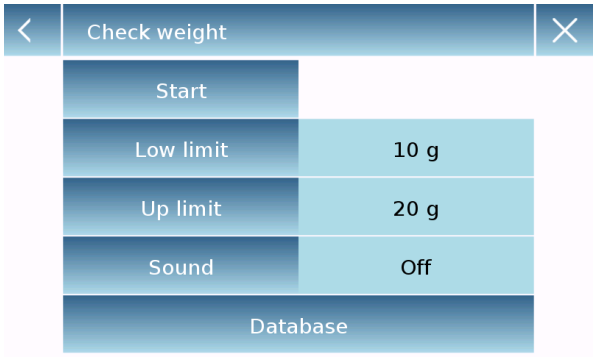

The pieces number control bar is yellow when the number of pieces loaded is lower than the minimum threshold. It is green when the pieces are inside the set range (with the beep sound when activated) and red when the number of pieces exceeds the upper threshold set.

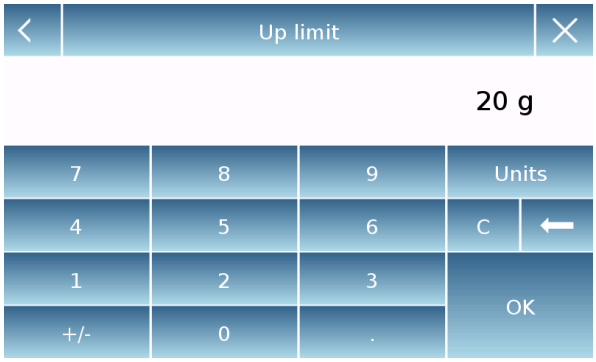
## 8.3 Check weight

This function allows you to define three different weight check methods:

- **Weight check with upper level threshold**
- **Weight check with lower level threshold**
- **Weight check within the two thresholds.**

To access the function from the "Functions" menu touch the " Check weight " icon.




Input the values for the "**low limit**" or "**up limit**" or both, according to the method you want.

**Low Limit, Up Limit:**
In the Limit Input screen, you can select the unit of measurement to be used for testing by touching the "**Unit**" key.
To deactivate the limit, enter the value "0" or touch the "C" key and then touch the "OK" key.

**Sound**: enable or disable the beeper. If enabled when the weight value is insdie the set range, a beep can be heard.

**Start**:
After entering the required data, touch the "Start" key to activate the weight check function.


**Database:**
By touching the "database" key you can create a custom weight check database with different items and methods.
Touch the "**New**" key and enter the name of the new record to be stored.
Enter the required data:

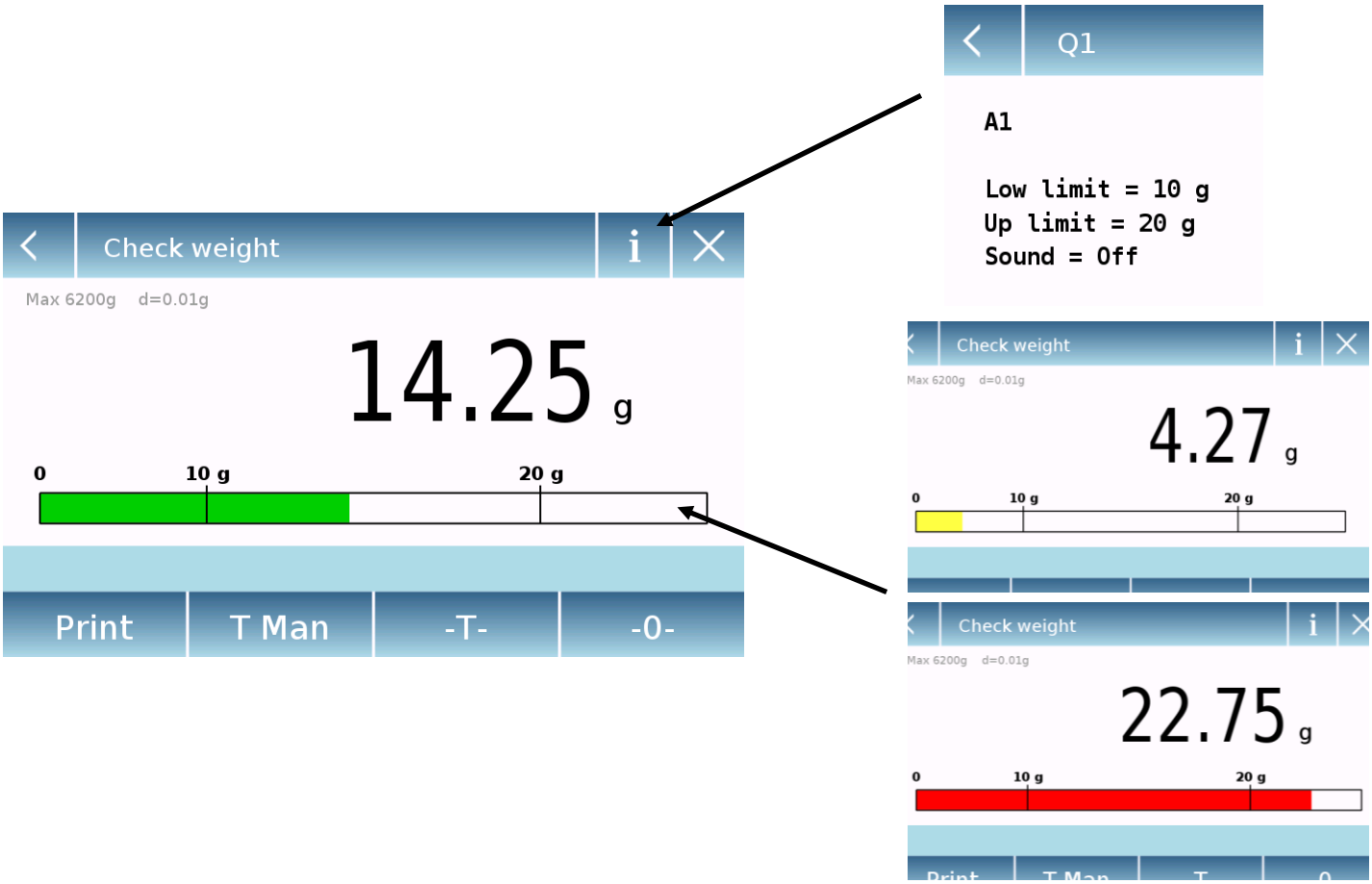
- Description: enter a description of the item.
- Low limit
- Up limit
- Sound

Then touch the "**Save**" key to save the record.

### 8.3.1 “Check weight” screen

The Check weight function screen is described below.

By touching the "i" key, you can see the parameters used for counting the pieces.

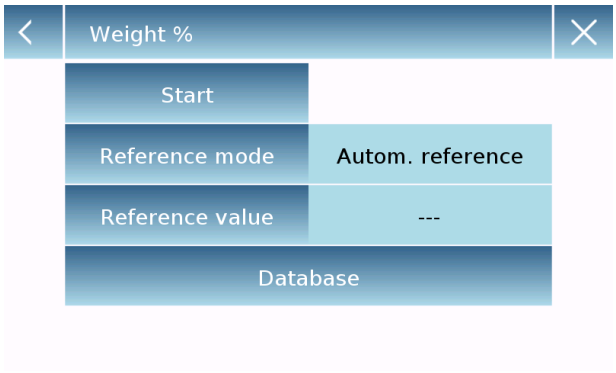



The Check weight bar is yellow when the loaded weight is lower than the minimum threshold and green when the weight is insdie the set range (with the beep sound when activated) and red when the weight is greater than the upper threshold set.

## 8.4 Percentage weight

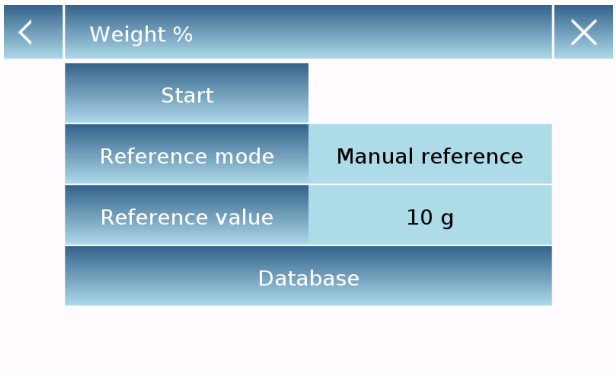
This function allows you to determine the weight percentage of a sample based on a reference weight.
The value of the reference weight can be obtained by a sample weight or manually entering the weight value.

To access the function from the "Functions" menu, touch the "**Weight %**" icon.




Select the mode:

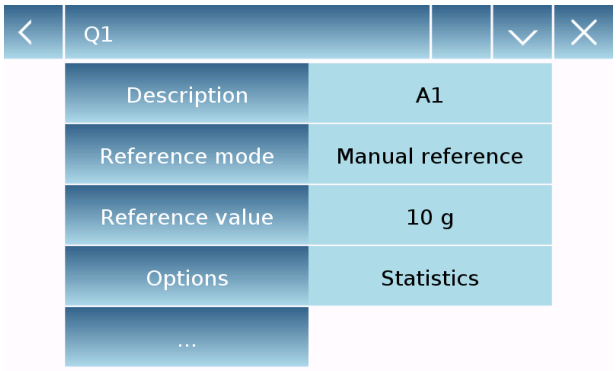
**Automatic reference:**
Selecting this mode upon startup will require you to load the reference sample weight (100%) on the weighing plate.



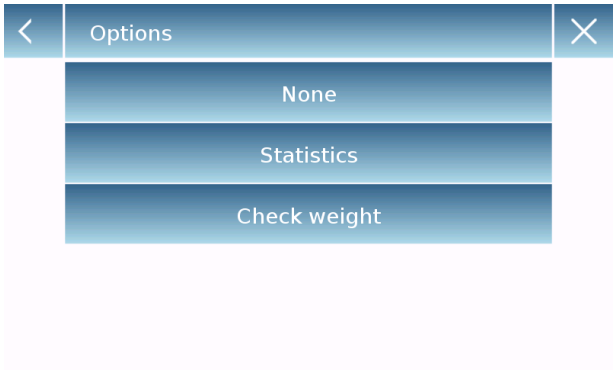

**Manual reference:**
Selecting this mode requires you entering the reference weight value (100%). Touch the "**Reference value**" key and enter the weight value in the input screen and select the desired unit of measurement.

**Start:**
After selecting the desired mode and entering the required data, touch the "Start" key to run the "Weight %" function.

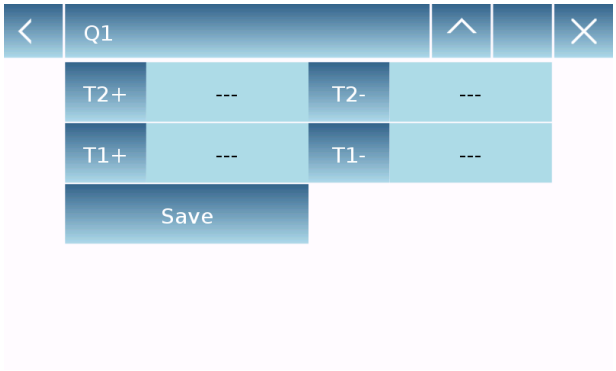
**Database:**
by touching the "Database" key, you can create a custom database to perform percentage weighing with different methodologies.
Using the database in addition to the standard percentage weighing, you can perform statistical weighing or set up to two levels of weigh checking thresholds.
Touch the "**New**" key and enter the name of the new record to be stored.




- **Description:** enter a description of the item.
- **Reference mode:** select the weight reference mode.

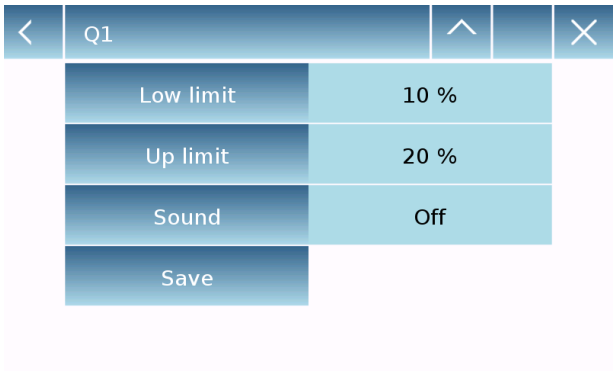



- **Reference value:** enter the reference weight value in manual reference mode.
- **Options:** you can select the statistical control by activating the "Statistics" function or the weight check by activating the "Check weight" function.




**Statistics:**
To enable this function, you need to enter:

- **Nominal value:** Enter the nominal value of the weight.
- **T2+, T2-, T1+, T1-:** enter the error tolerance threshold values. (Optional entry).
- **Save:** touch the "Save" key to store the record

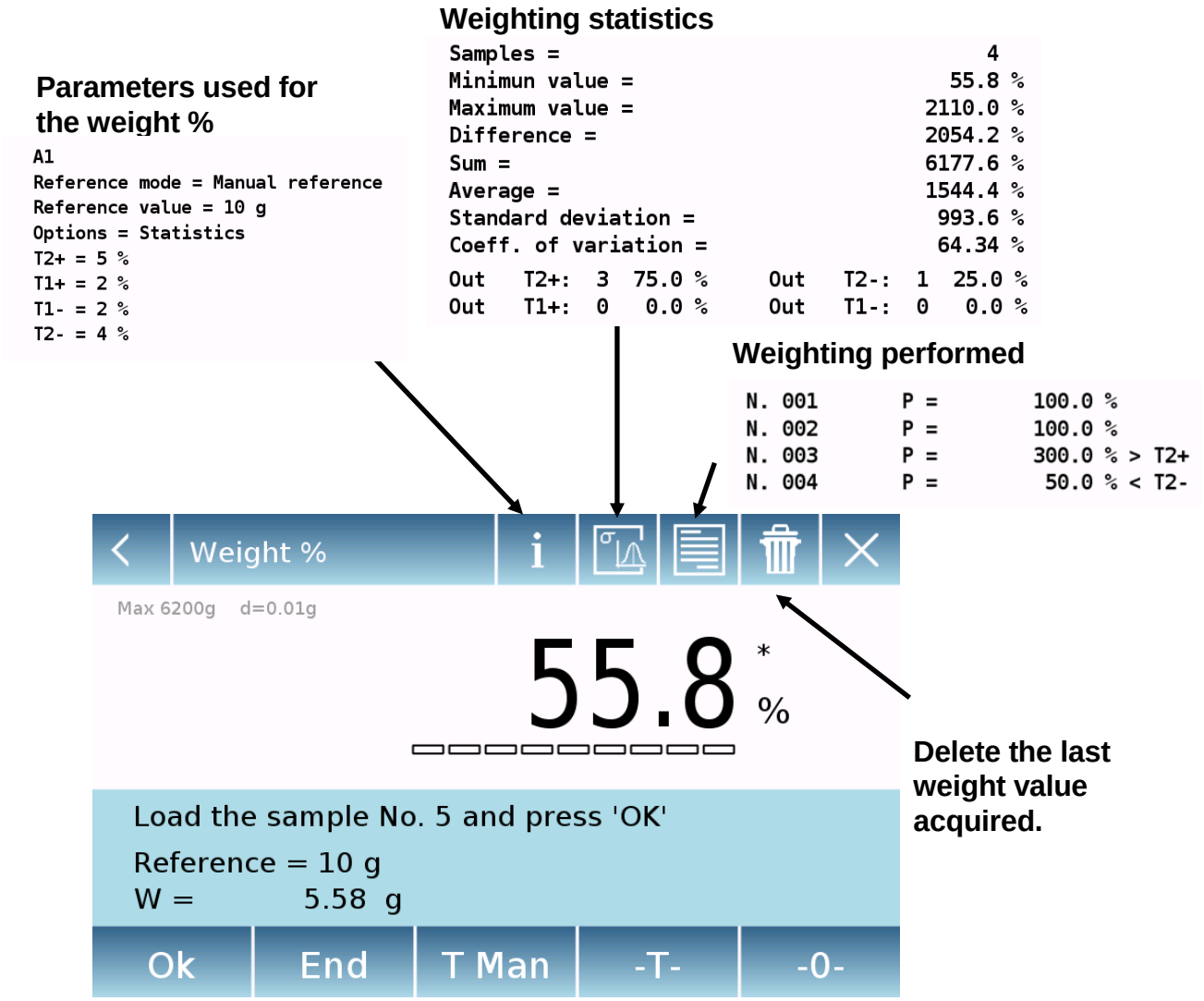



**Check weight:**
To enable this function you need to enter:

- **Low limit:** enter the minimum acceptable weight value.
- **Up limit**: enter the maximum acceptable weight value.
- **Sound:** you can activate or deactivate the beeper when the weight is inside the set range.
- **Save:** touch the "Save" key to store the record

### 8.4.1 Screen of percentage weigh with “Statistics” function.

The following are the functions of the percentage weighing with statistical calculation.

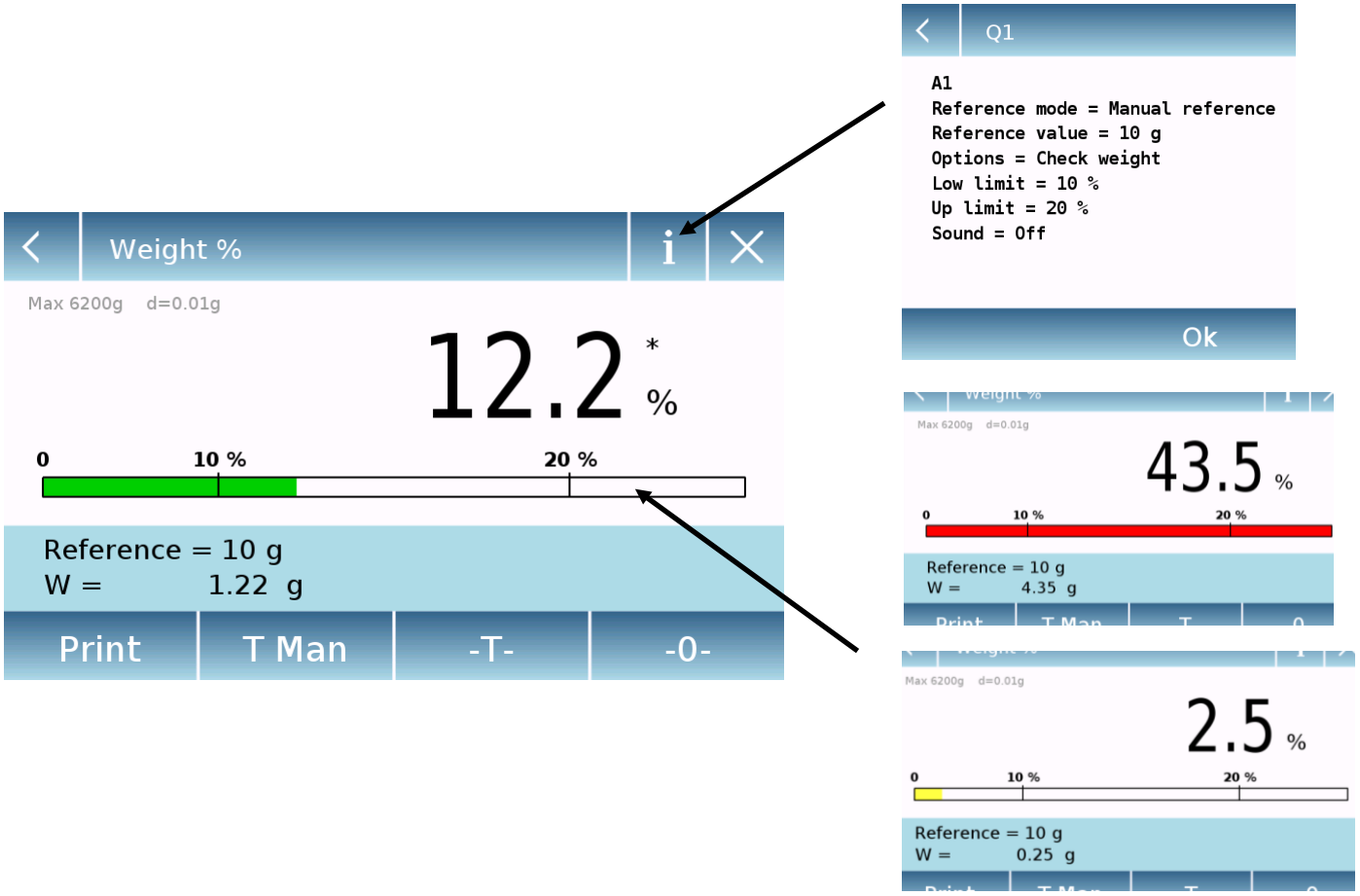



Touch the "**Ok**" key to acquire a new weight value and touch the "END" key to end the acquiring and perform the final statistical calculation.

### 8.4.2 Screen of percentage weight with “Check weight” function.

The following are the functions of the percentage weight with weight check.

By touching the "i" key, you can see the parameters used for weight check.

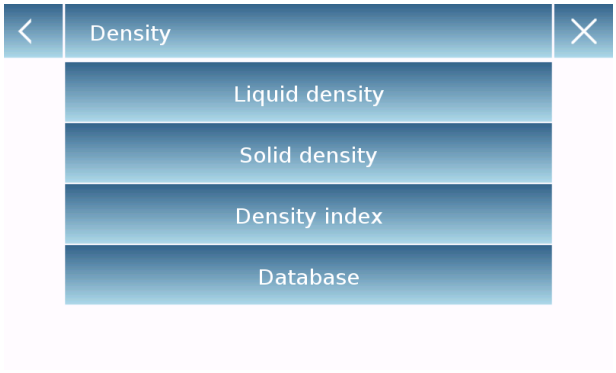


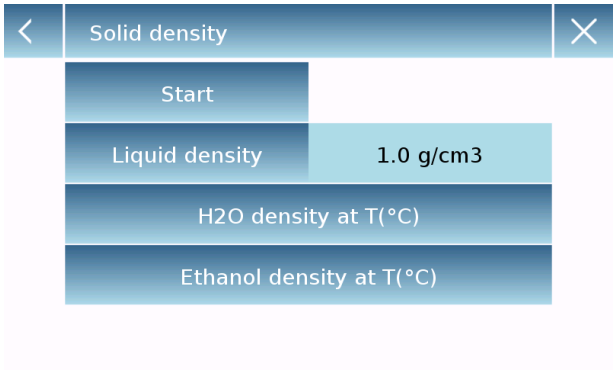

The weight check bar is yellow when the loaded weight is lower than the minimum threshold, green when the weight is within the set range (with the beeper when activated) and red when the weight is greater than the upper threshold set.

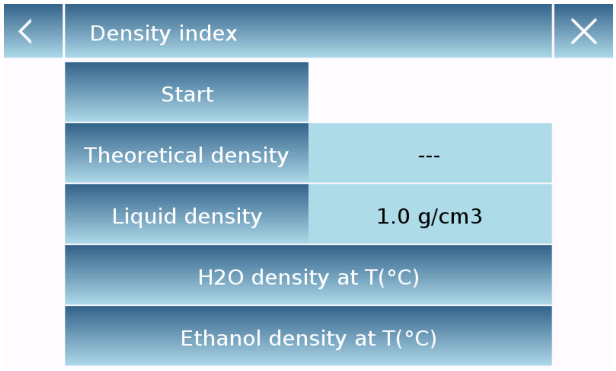
## 8.5 Density calculation

The density function allows determining the density value of solid or liquid substances. The determination is based on the principle of Archimedes that a body immersed in a liquid receives an upward thrust equal to the weight of the volume of the displaced fluid. For the determination, you can use the weigh below hook (if available on the balance) or the optional “Density kit" to mount on the plate of the balance.

To access the function from the "Functions" menu  touch the "**Density**" icon.



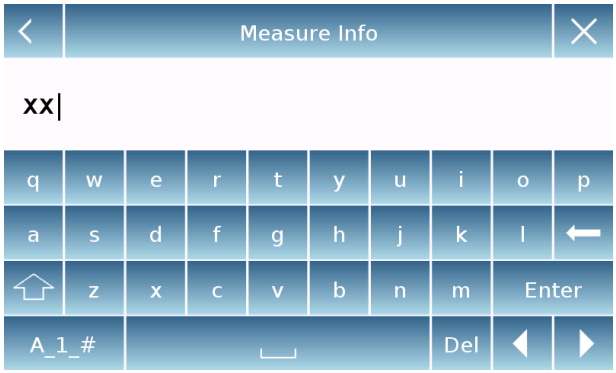




Select the mode:
**Liquid density:** selecting this you will be required to enter the solid density value of the sinker (g/cm3) to be used to determine the density of the liquid.
Then touch the "**Start**" key to proceed with the measurement

**Solid density:** selecting this you will be required to enter the liquid density value (g/cm3) to use for the determination of the solid density. If using distilled water or ethanol, select the one used and enter only the temperature value. The density value of the selected liquid at the selected temperature will automatically be calculated. (The reference tables are stored inside the balance memory).
Then touch the "**Start**" key to proceed with the measurement

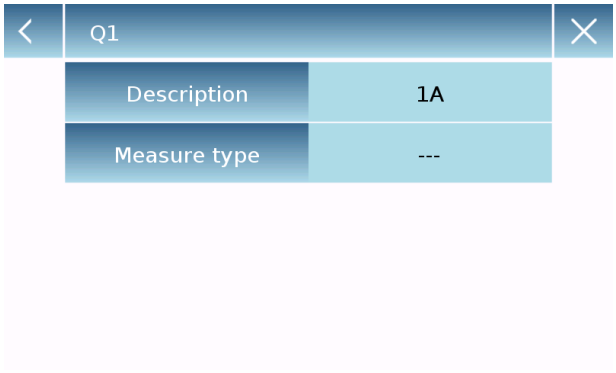
**Density index:** by selecting this you can determine the difference in density as a percentage between two solid samples. (One solidified at room temperature and the other under vacuum).
The density index can be determined by measuring for both samples their density value, or by using the "**theoretical density**" value for the sample solidified at room temperature and measuring the density value only for the vacuum sample. In this case, you need to touch the "**Theoretical density**" key to enter the value.
Then touch the "**Start**" key to proceed with the measurement




Optional information about the measurement to be performed will be required.

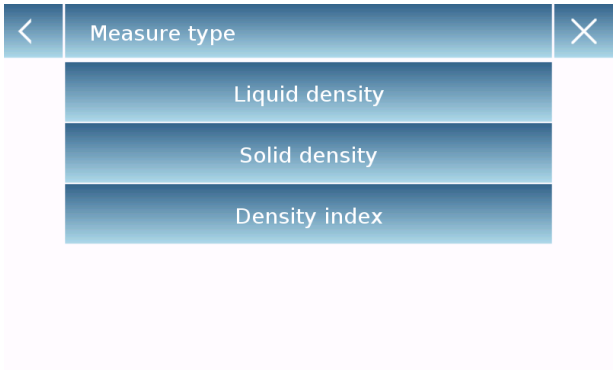
Touch the "**Enter**" key to confirm.

Now perform the steps shown on the display to determine the density index.




**Database:**
By touching the "database" key, you can create a custom database to determine the different density types.
Touch the "**New**" key and enter the name of the new record to be stored.

- **Description:** enter a description of the item.



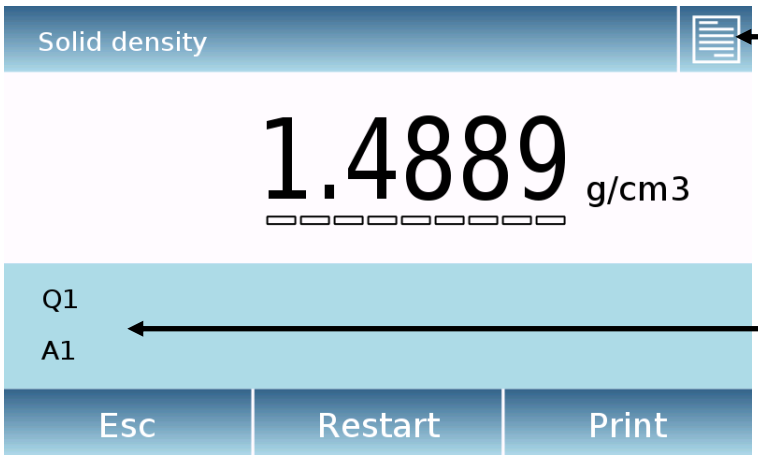

- **Measurement type:** Select the type of density to be determined.

After entering all required data, touch the "**Save**" key to save the new record.

### 8.5.1 Screen of the “Density of a solid” calculation function.

Below are the functions for calculating the density of a solid.

**Acquired values for density determination**




```
Q1
A1

Liquid density = 1 g/cm3
Weight in AIR    =         12.98 g
Weight in LIQUID =          4.26 g
```

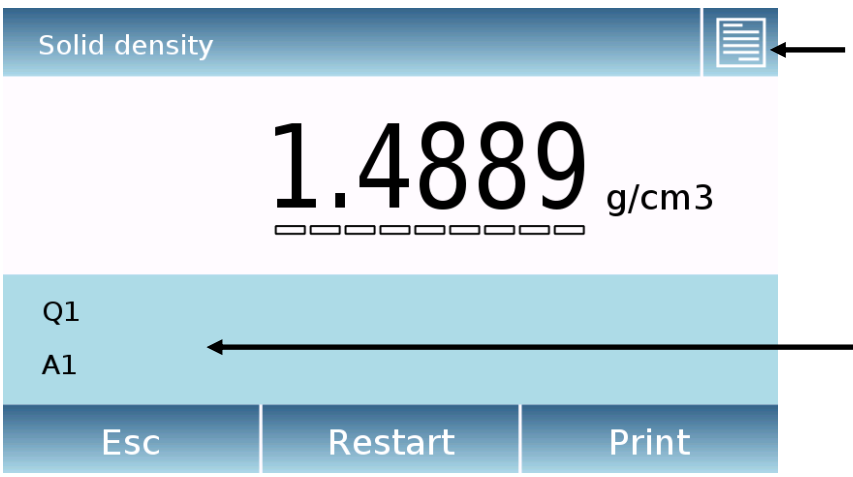
**Information about the database used:**
**Record name**
**Test description**

Touch the "**Esc**" key to exit the function, the "**Restart**" key to make a new measurement, and the "**Print**" key to print the measurement result.

### 8.5.2 Screen of the “Density of a liquid” calculation function

Below are the functions for calculating the density of a liquid.

**Acquired values for density determination**




```
Q1
A1

Sinker density = 3 g/cm3
Weight in AIR    =         12.82 g
Weight in LIQUID =          4.27 g
```

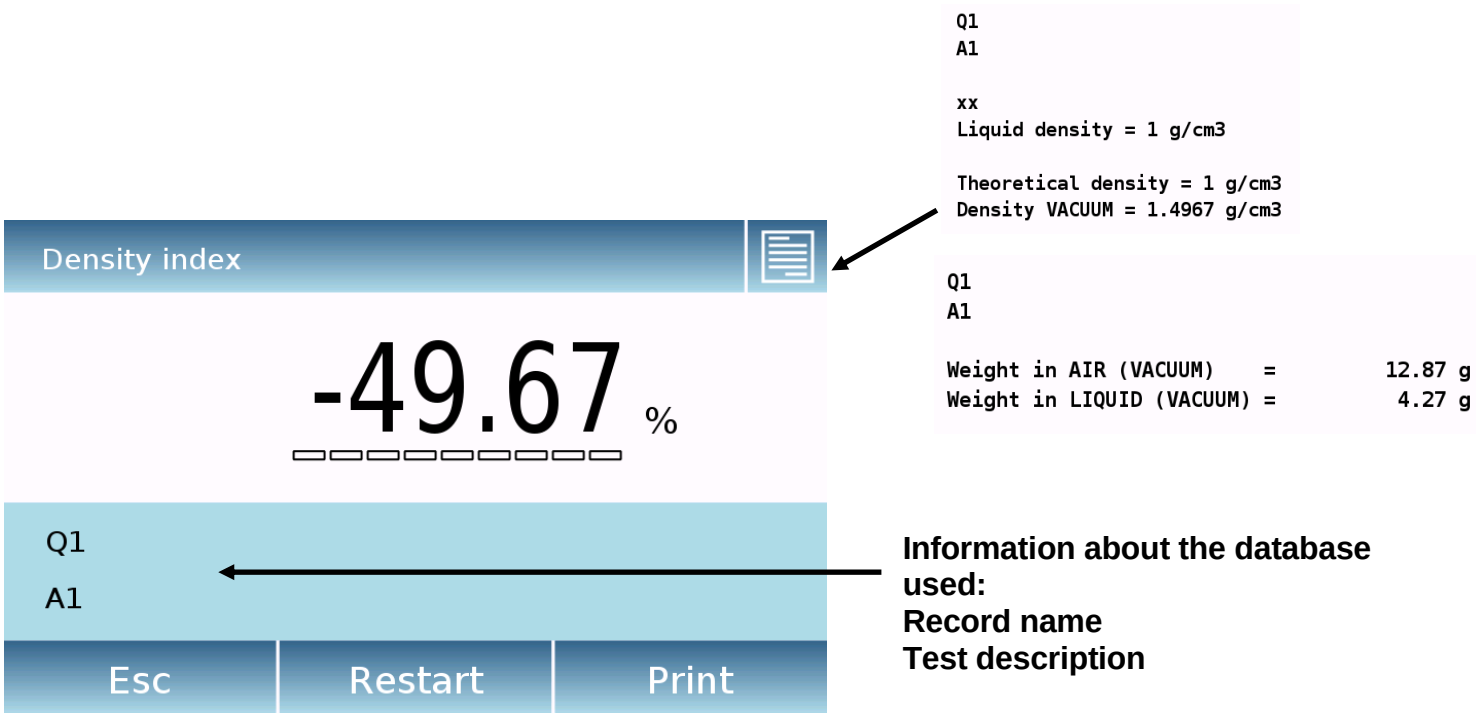
**Information about the database used:**
**Record name**
**Test description**

Touch the "**Esc**" key to exit the function, the "**Restart**" key to make a new measurement, and the "**Print**" key to print the measurement result.

### 8.5.3 Screen of the “Density index” calculation function.

Below are the functions for calculating the density index.

**Acquired values for density determination**

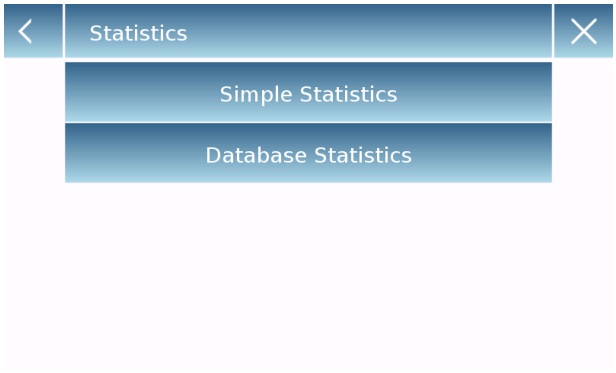



Touch the "**Esc**" key to exit the function, the "**Restart**" key to make a new measurement, and the "**Print**" key to print the measurement result.

## 8.6 Statistics

This function allows you to perform weighing statistics in simple mode, without defining the nominal weight and tolerance value or you can define the relative nominal weight and tolerance values by using database statistics. At the end of the procedures in both cases, it is possible to print the statistical result of the weights value.

To access the function from the functions menu, touch the "**Statistics**" icon.

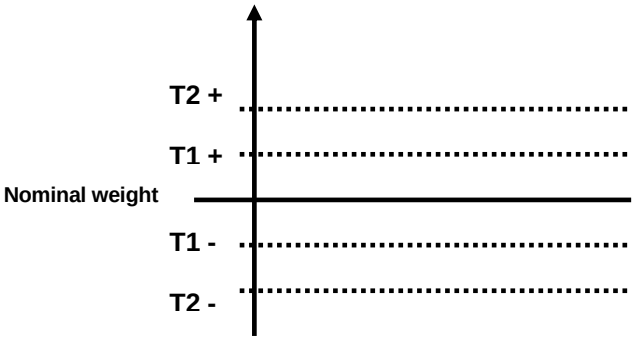



Select the mode:
**Simple statistics:** you can perform the statistics up to 500 consecutive weights.
Touch the "Simple Statistics" key and immediately the screen will be activated to perform the weighing operations.

**Database statistics:** you can store and then recall a custom statistics method.

By touching the "database statistic" key you can create a custom database to determine different statistical mode.
Touch the "**New**" key and enter the name of the new record to be stored.

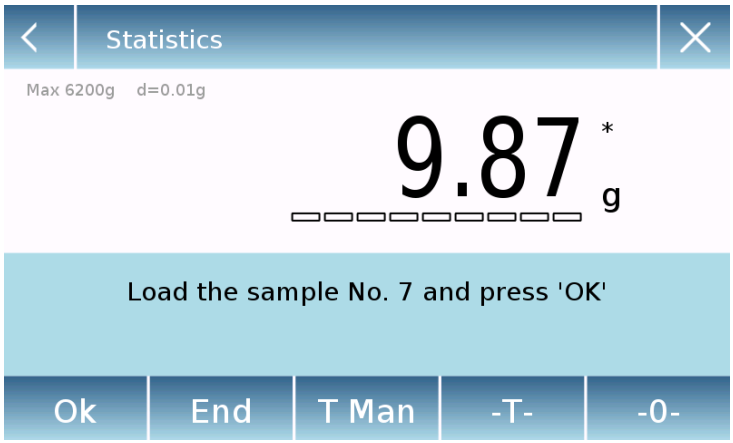

- **Description:** enter a description of the item.
- **Nominal weight:** enter the nominal weight value and select the desired unit of measurement.
- Enter values for tolerance (Optional Data).
- **T2+ :** 2nd positive tolerance
- **T2- :** 2nd negative tolerance
- **T1+ :** 1st positive tolerance
- **T1- :** 1st negative tolerance



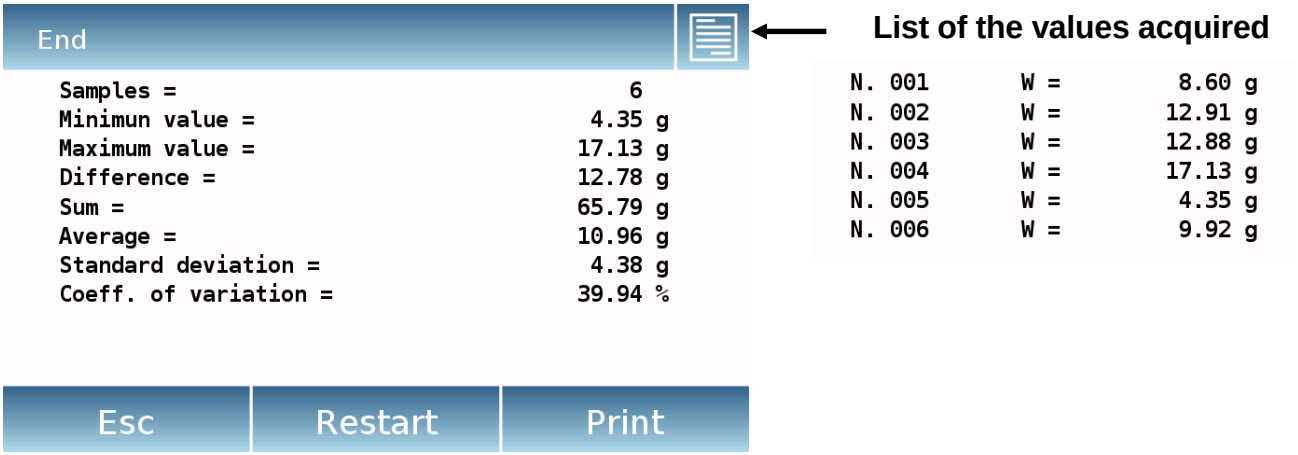

After entering all required data, touch the "**Save**" key to save the new record. Before saving, a congruity check of the entered data is performed. An error message will be prompted to make the necessary corrections.

### 8.6.1 Screen of “Simple statistics” function

Below are the simple statistical function functions.



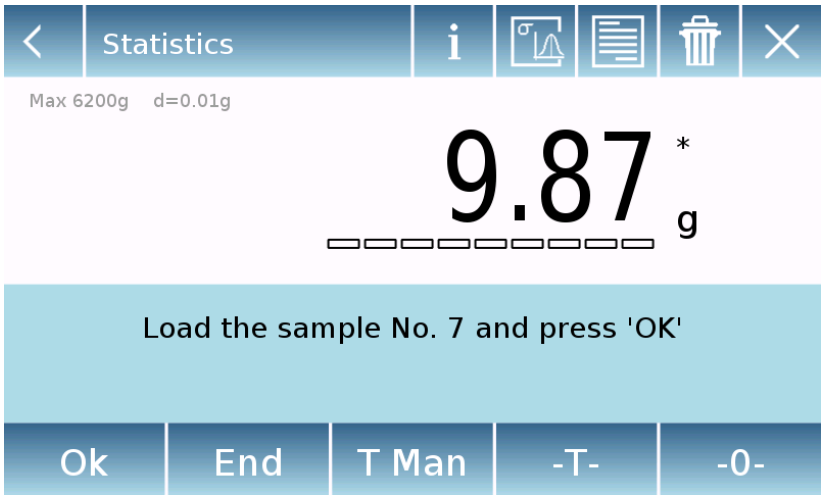

Touch the " **Ok**" key to acquire a new weight.
Touch the " **T Man**" key to input a tare value
Touch the “**-T-**“ key to tare
Touch the “**- 0** “ key to reset/zeroing the value
Touch the "**End**" key to end the weighing acquisition and follow the statistical calculation




Touch the "**Esc**" key to exit the function, the "**Restart**" key to make a new measurement and the **"Print"** key to print the measurement result.

### 8.6.2 Screen of “Database statistics” function

Below are the functions related to the database statistics function.




Touch the " **Ok**" key to acquire a new weight.
Touch the " **T Man**" key to input a tare value
Touch the “**-T-**“ key to tare
Touch the “**- 0** “ key to reset/zeroing the value
Touch the "**End**" key to end the weighing acquisition and follow the statistical calculation

Touch the key  to delete the last weight value acquired.

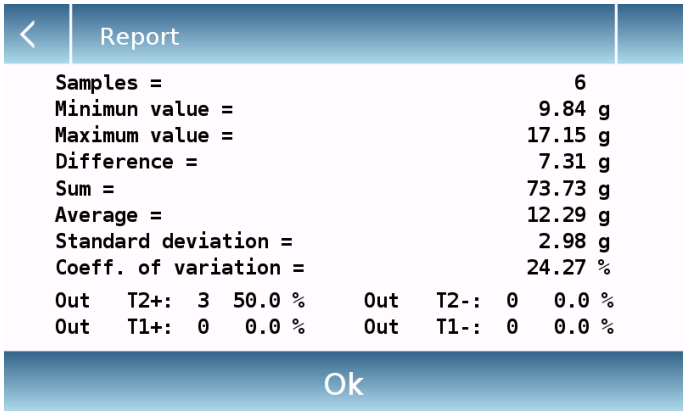
Touch the key  to display the weight values acquired.

```
N. 001      P =       10.00 g
N. 002      P =       10.00 g
N. 003      P =       10.22 g > T2+
N. 004      P =        8.35 g < T2-
N. 005      P =        9.59 g < T2-
```

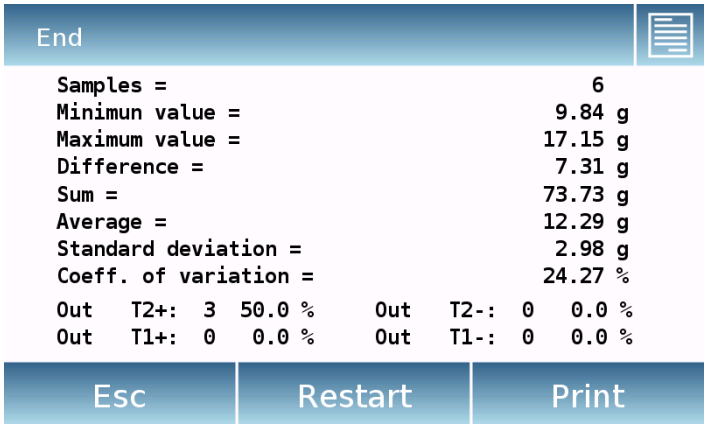
Touch the key  to display the parameters set for statistical calculation

```
A1

Nominal Weight = 10 g

T2+ = 2 %
T1+ = 1.5 %
T1- = 1.8 %
T2- = 1.9 %
```

Touch the key  to display the temporary statistical report.




After touching the "**End**" key the screen with the result of the weighing statistics is displayed.

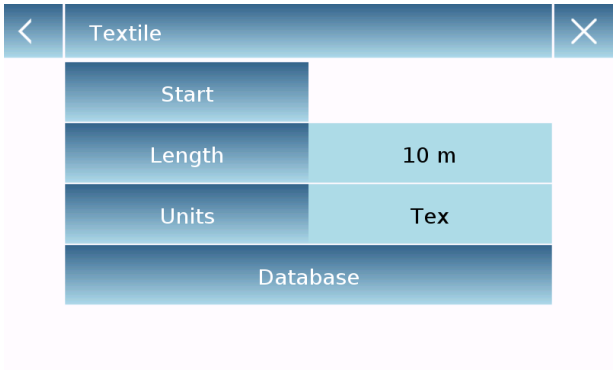



Touch the "**Esc**" key to exit the function, the "**Restart**" key to make a new measurement and the **"Print"** key to print the measurement result.

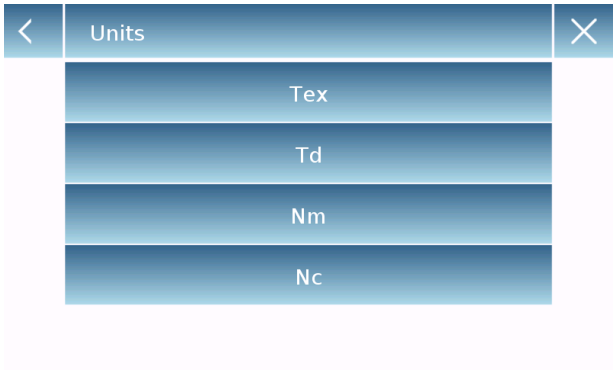
## 8.7 Textile

This function determines the title of the yarns by weighing a known length skein. Also, using the database function, you can also perform a weighing statistic.

To access the function from the "Functions" menu, touch the "**Textile**" icon.

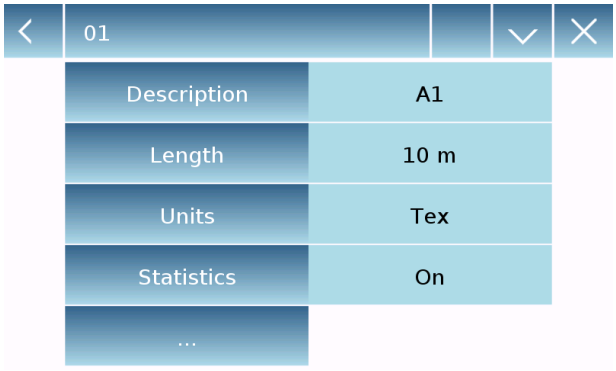



**Length:**
Enter the value of the skein length; the value can be expressed in meters or yards. You can select the desired unit while touching on “Length”.



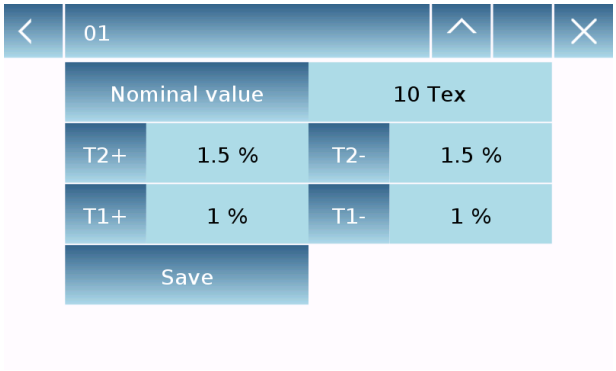

**Units:**
Select the unit with which you want to view the result. (Tex, Td, Nm, Nc). However, the selected unit can still be modified during weighing by touching the symbol displayed to the right of the weight value shown.

**Start:**
After entering the required data, touch the "**Start**" key to execute the "Textile" function.




**Database:**
By touching the "**database**" key, you can create a custom database for "Textile" weighing.
Using the database in addition to the simple "textile" weighing, you can perform the statistical check of the weights.
Touch the "**New**" key and enter the name of the new record to be stored.

- **Description:** enter a description of the item.
- **Length:** select the desired measurement unit and enter the length of the skein.

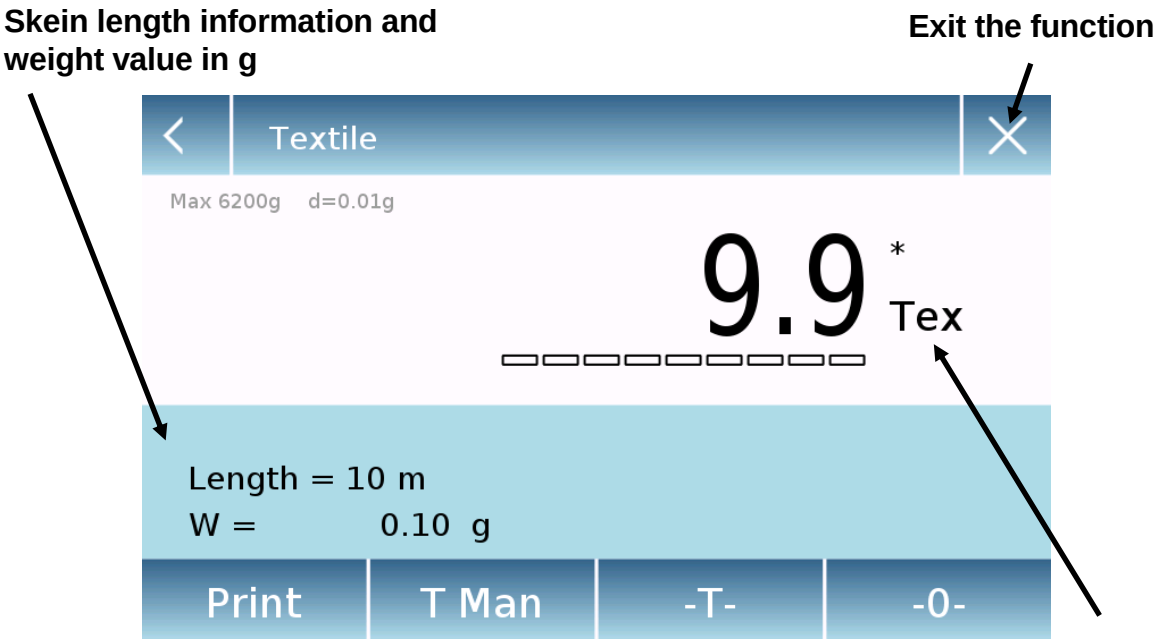



- **Unit:** select the unit with which you want to view the result. (Tex, Td, Nm, Nc). However, the selected unit can still be modified during weighing by touching the symbol displayed on the right of the weight value
- **Statistics:** you can activate the statistical check of the weights. Activating this function, you must enter the following data:

- **Nominal value:** select the unit of measurement and enter the nominal weight value to be checked.
- **T2+, T2-, T1+, T1-:** enter the error tolerance threshold values. (Optional entry).
- **Save:** touch the "Save" key to save the entered record

### 8.7.1 Screen of the “Textile” function.

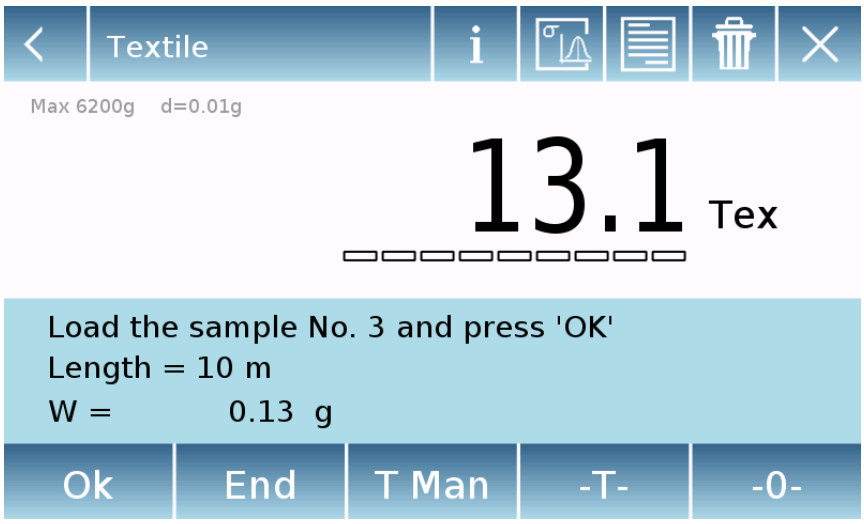
Below are the functions in the "Textile" screen.




Touch the "**Print**" key to print the result.
Touch the “**T Man**” key to input a tare value
Touch the **“-T-**“ key to tare
Touch the “**- 0 -**“ key to reset/zeroing the value.

### 8.7.2 Screen of the database textile function with statistics enabled

Below are the functions related to the statistical database textile function.




Touch the **"Ok"** key to acquire a new weight.
Touch the **"T Man"** key to input a tare value
Touch the **"-T-"** key to tare
Touch the **"- 0 -"** key to reset/zeroing the value
Touch the "**End**" key to end the weighing acquisition and perform the statistical calculation

Touch the key  to delete the last weight value acquired.

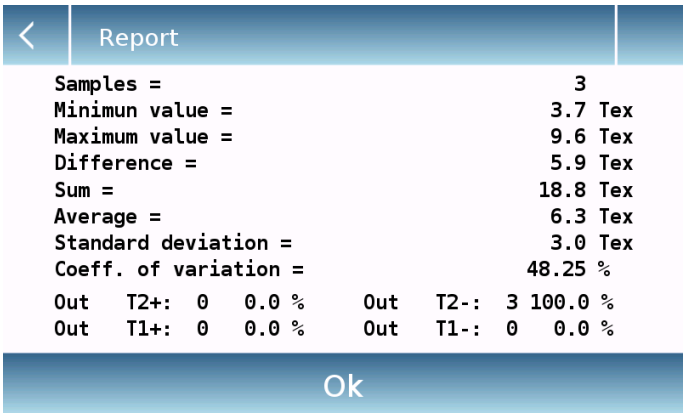
Touch the key  to view the weight values acquired

```
N. 001      V =        9.4 Tex < T2-
N. 002      V =        9.4 Tex < T2-
N. 003      V =       13.1 Tex > T2+
N. 004      V =       13.1 Tex > T2+
```

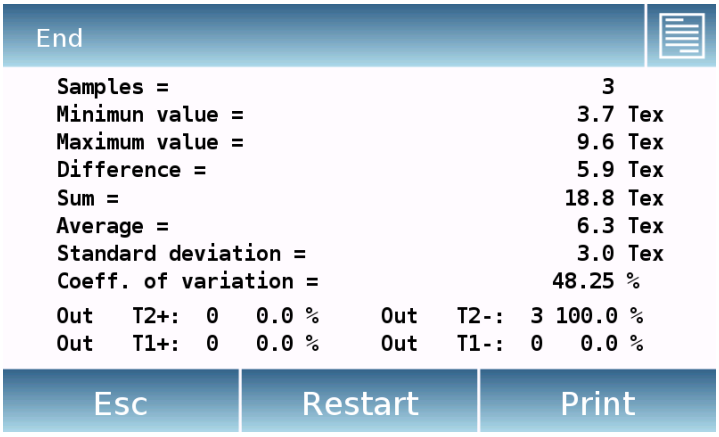
Touch the key  to display the parameters set for statistical calculation

```
A1
Length = 10 m
Units = Tex
Statistics = On
Nominal value = 10 Tex
T2+ = 1.5 %
T1+ = 1 %
T1- = 1 %
T2- = 1.5 %
```

Touch the key  to display the temporary statistical report.




After touching the "**End**" key, the screen with the results of the weighing statistics is displayed.

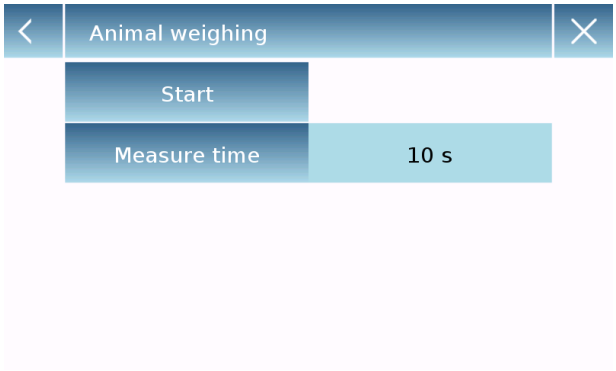



Touch the "**Esc**" key to exit the function, the "**Restart**" key to make a new measurement and the **"Print"** key to print the measurement result.

## 8.8 Animal weighting

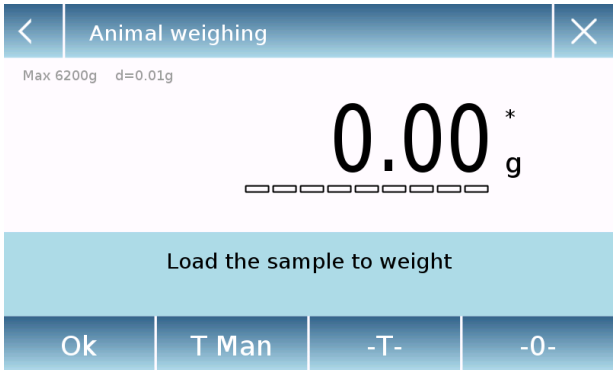
This function allows you to measure the weight of unstable samples (i.e. animals) or samples that are in very unstable environments. The weight is determined as an average value based on multiple weight measurement within a set time interval.

To access the function from the "Functions" menu, touch the "**Animal weighing**" icon.




**Measure time:**
Enter the desired measurement time in seconds. (Minimum value 5 seconds, maximum 90 seconds)

**Start:**
After entering the required data, touch the "Start" key to perform the Animal weighing function.

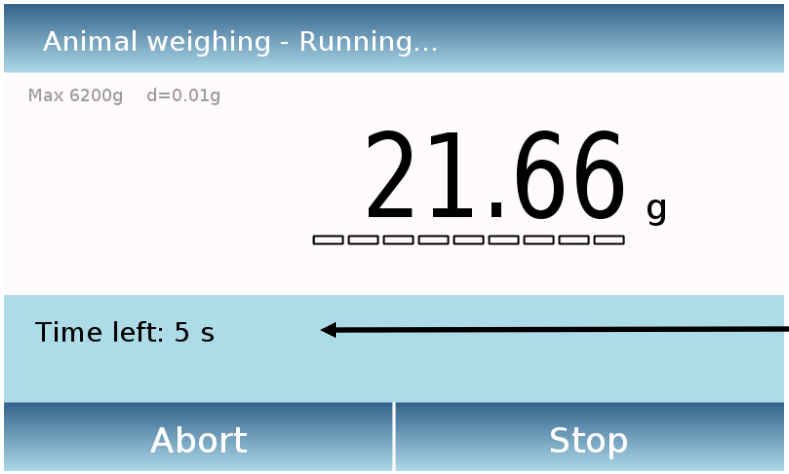



If necessary, reset the indication or load a tare.
Load the sample to be analyzed and touch the "**Ok**" key.

### 8.8.1 Screen of the “Animal weighting” function.

Below are the functions in the "Animal weighing" screen.

**Information shown during weight acquiring**




**Countdown indication**

Touch the "**Abort**" key to cancel the measurement
Touch the "**Stop**" key to stop the countdown and display the result

**Information at the end of weight acquiring**


**The average value of the weight acquired in the set time interval**

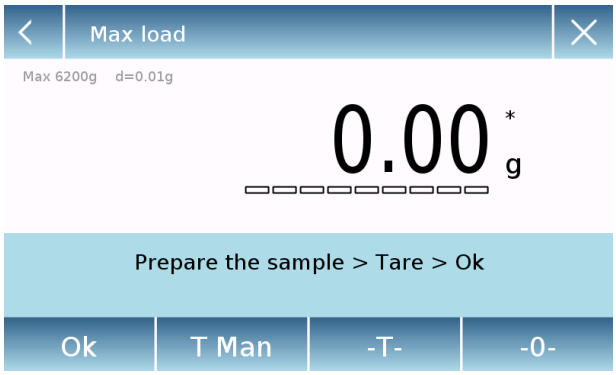
**Indication of the time set for the measurement**

Touch the "**Esc**" key to exit the function, the "**Restart**" key to make a new measurement and the **"Print"** key to print the measurement result.
.

## 8.9 Maximum load

This function allows measuring and capturing the maximum breakage load of a solid sample.

To access the function from the "Functions" menu, touch the "**Max load**" icon.




Selecting the function immediately displays the measurement screen.

- Prepare the sample to be tested.
- Perform tare or zero reset if necessary.
- Touch the "**Ok**" key to start the test.

Once the tested sample breakage load is reached, the maximum weight will be displayed.


Weight detected on the plate

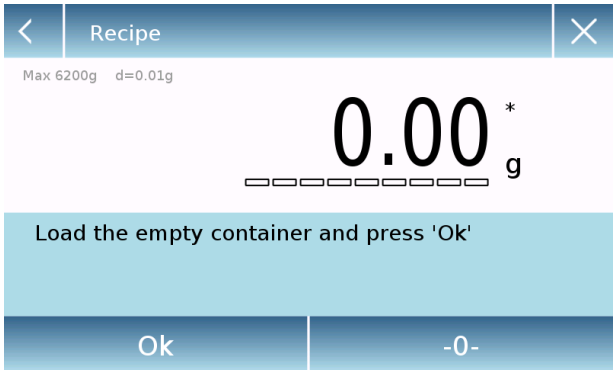
Touch the "**Esc**" key to exit the function, the "**Restart**" key to make a new measurement and the **"Print"** key to print the measurement result.

## 8.10 Recipe

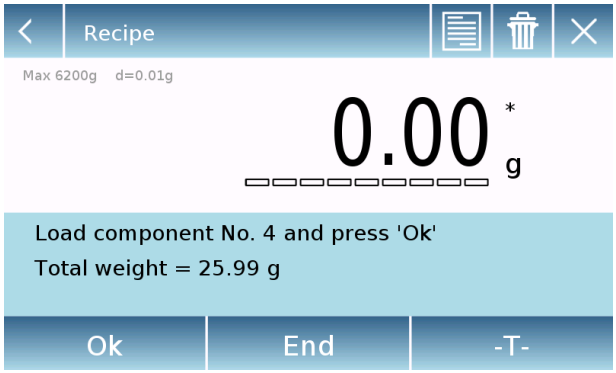
This function allows you to prepare a compound by dosing a set of components in manual mode or by calling a formula with ingredients and tolerances previously entered in the recipes database.

To access the function from the "Functions" menu, touch the "**Recipe**" icon.


**Simple recipe:**
This mode allows you to carry out a series of consecutive weights and finally get the total weight of the dosed components and the relative list with the value of the individual weights.



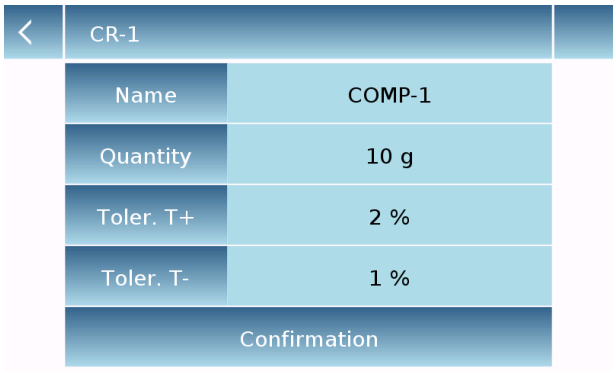

Touching the "Simple recipe" key immediately displays the measurement screen.




- Load a container and do the tare. Or, if necessary, reset the indication with the "-0-" key.
- Now dose the first component and touch the "**Ok**" key to confirm the acquiring.
- Then repeat the operation for all the components of the recipe.
- To finish the dosing operation of the components, touch the "**End**" key.


**Database recipe:**
By touching the "**database**" key, you can create a custom database for the "recipe" function.
Using the database, you can store custom recipes with a set of components and their tolerances.
Touch the "**New**" key and enter the name of the new record to be stored.

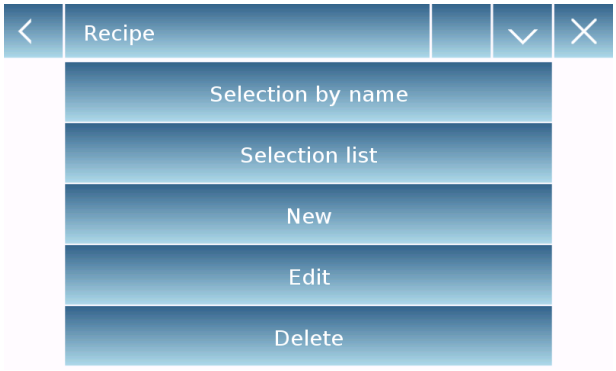

- **Description:** enter the item description.
- **Add:** touch the add key to insert a component.



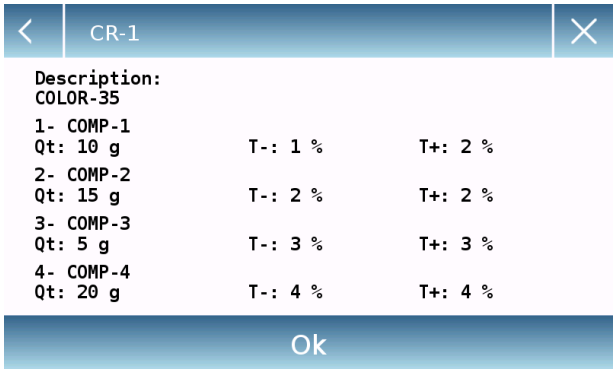

- **Name:** enter the name of the component.
- **Quantity:** select the desired unit of measurement and enter the nominal quantity of the component.
- **Toler. T+:** enter positive percentage tolerance.
- **Toler. T-:** enter negative percentage tolerance.
- **Confirmation:** touch the confirmation key to accept the entered values. In case of errors a verification of the correctness of the data entered will be performed; check that all parameters entered are correct.

After confirming, proceed with the "add" key to enter all the desired components.

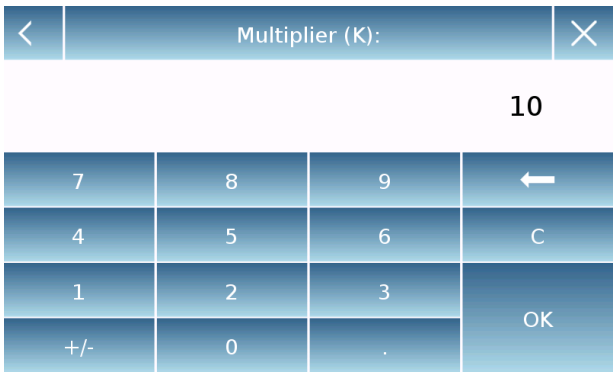

- **Save:** after entering all the desired components, touch the "Save" key to store the recipe.



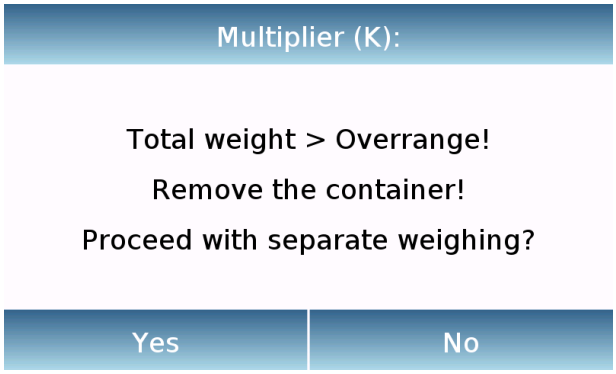

To recall the recipe entered in the database, use the "**Selection list**" command, select the recipe you want and proceed as shown below.




After selecting the desired recipe, a summary screen will be displayed showing all the components and their amount needed to make the recipe.




Touch the "**Ok**" key to confirm and proceed by entering the multiplier factor needed to determine the total amount of the recipe.
(i.e. if the recipe has been stored to produce 10g of product and you want to produce 100g insert a "K" factor of 10). If the entered value does not allow the dosing of one of the components because its quantity exceeds the balance capacity, it will not be accepted.

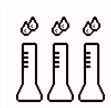



If the total weight of the recipe instead exceeds the balance capacity, but the individual components are lower, it will be asked whether to proceed with the "separate recipe".

- **Yes:** to proceed with the separate recipe.
- **No:** to change the value of the multiplier factor "K" and reduce the quantities.

The recipe screen shows the type of recipe you are using by displaying two symbols as described below:

Symbol displayed in case of "**unique recipe**".



Symbol displayed in case of "**separate recipe** ".

### 8.10.1 Screen of the “Simple recipe” function.

The following are the functions for the simple recipe function.

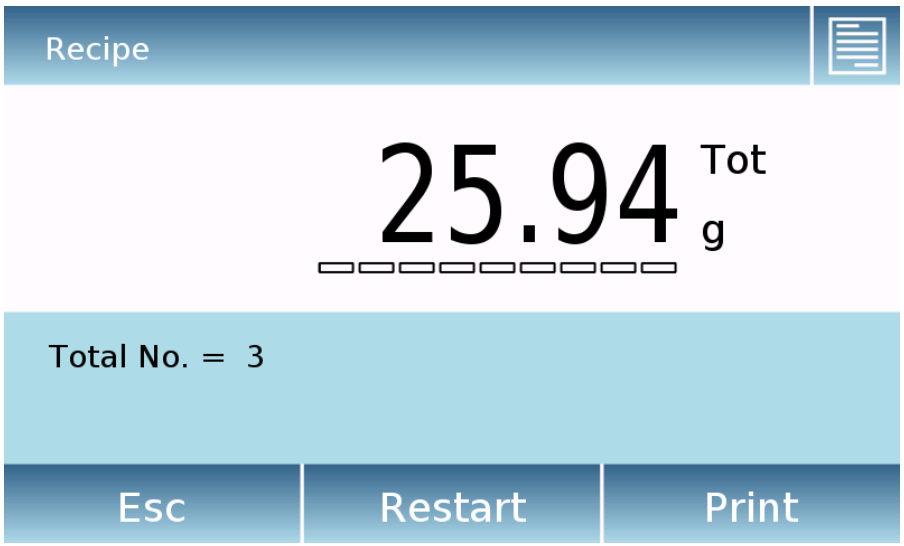

Touch the "**Ok**" key to acquire a new weight.
Touch the "**End**" key to end the weighing acquire and perform the statistical calculation

Touch th  key to clear the last weight value acquired.

Touch the  key to view the weight values acquired.

```
Comp. No. 01        Q.ty =        12.93 g
Comp. No. 02        Q.ty =         4.30 g
Comp. No. 03        Q.ty =         8.71 g
```

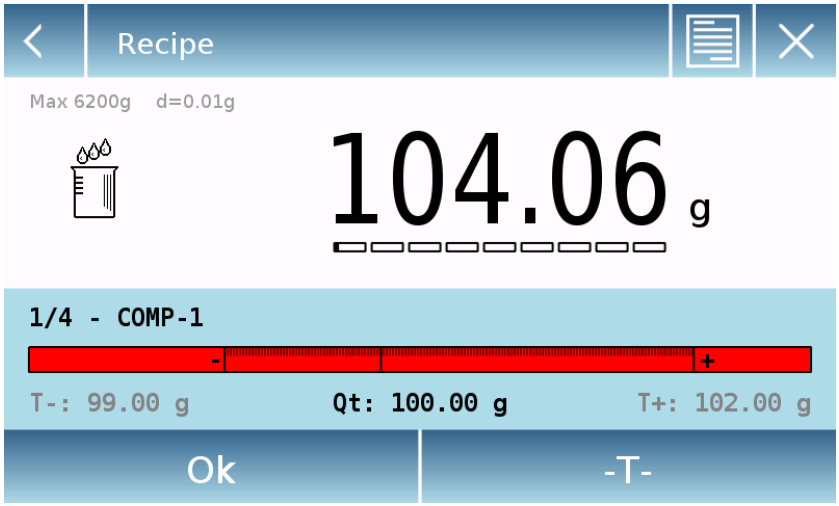
After touching the "End" key a screen will appears with the results of the sum of the weights.




Touch the "**Esc**" key to exit the function, the "**Restart**" key to make a new measurement and the **"Print"** key to print the measurement result.
.

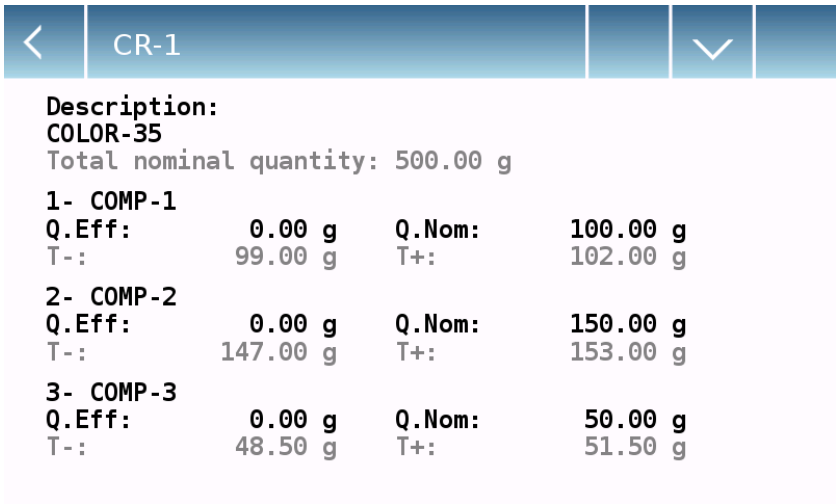
### 8.10.2 Screen of the “Database recipe” function.

Below are the features in the "Database recipe" screen.




Touch the "**Ok**" key to acquire a new weight.
Touch the “**T**” key to reset the weight indication.

Touch the  key to view the list of the recipe components and the components already entered:




Dosing bar:

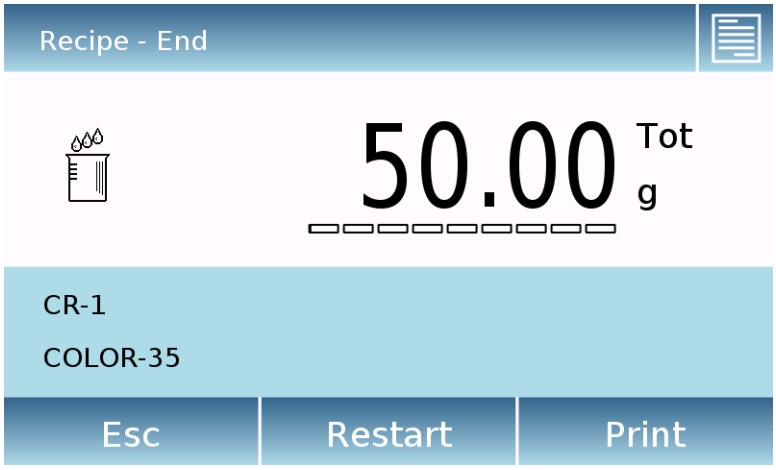

The dosing bar works with automatic graduated enlargement. When the dosed quantity approaches the two levels of tolerance, the center zone is automatically zoomed to allow dosing with a greater accuracy.

The bar uses different colors:
Yellow when the loaded weight is lower than the minimum threshold
Green when the weight is within the set range
Red when the weight is higher than the upper threshold set

If during dosing the amount of dosed component exceeds that allowed by the tolerances, it will be required to perform automatic adjustment of the recipe with a new total quantity and the quantity update of all the components of the recipe.


Touch the "Yes" key to confirm the adjustment, press the "No" key to return to the dosing screen. In this case, you can remove excess quantity or cancel the recipe by touching the "**X**" key.

When the correct dosage of all components is completed, the actual dosed amount will be displayed:



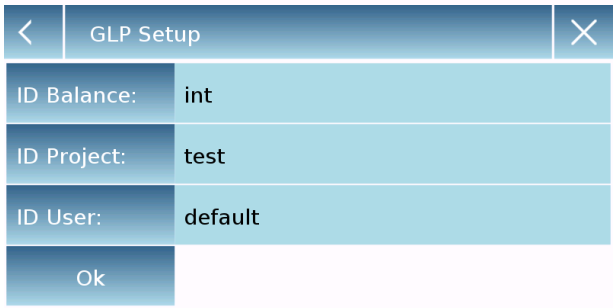

Touch the  key to view the complete list of components and their dosed quantities.

Touch the "**Esc**" key to exit the function, the "**Restart**" key to make a new measurement and the **"Print"** key to print the measurement result.

## 8.11 Setting the GLP data

This function allows you to customize and create a database with GLP parameters.

To access the function from the "Functions" menu, touch the "**GLP**" icon.

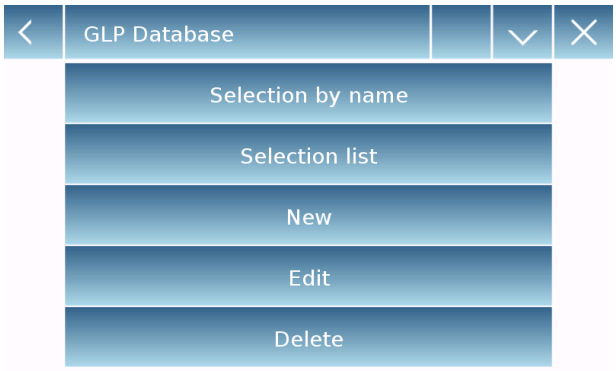




**GLP Setup:** use this command to enter GLP parameters when you do not want to save them to the database.

The data entry screen will be displayed. Touch the corresponding parameter to enter the desired data.

- **ID Balance**
- **ID Project**
- **ID User**

After entering the data, press the **"Ok"** key to confirm.
Note that the maximum number of characters allowed per parameter is 20.





**GLP Database**: by touching this command, you can access the GLP parameter database management menu

Below are all the available functions

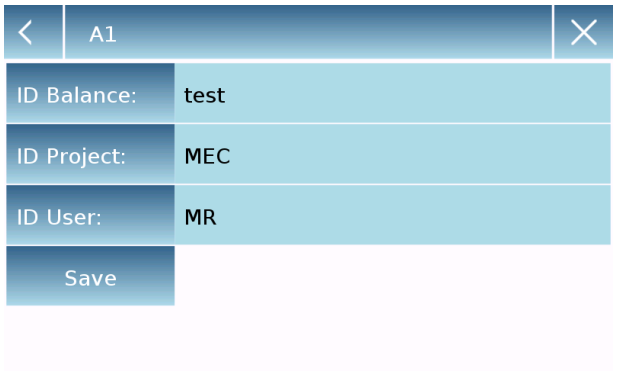
- **Selection by name:** by touching this key, you can call up a program by entering the corresponding name.
- **Selection list:** by touching this key, you can call up a program by selecting it from a list.
- **New:** by touching this key, you can enter a new record.
- **Edit:** by touching this key, you can access and change the GLP parameters.
- **Delete:** touch this key to delete one or more previously stored records.
- **Print:** by touching this key you can select a GLP record and print it.
- **Export (Usb):** by touching this key, you can export the database to a USB pen.

- **Import (Usb):** by touching this key, you can import from a USB pen a database.

The selection, edit, delete, print, export and import commands are the same as described in **chapter 9.7.1**


**New**: this command allows you to enter a new record.

Enter the name you want to assign to the record and confirm with the "**Enter**" key.

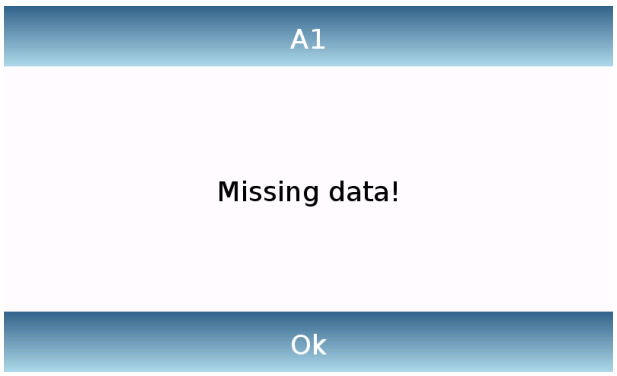



The data entry screen will be displayed. Touch the corresponding parameter to enter the desired data.

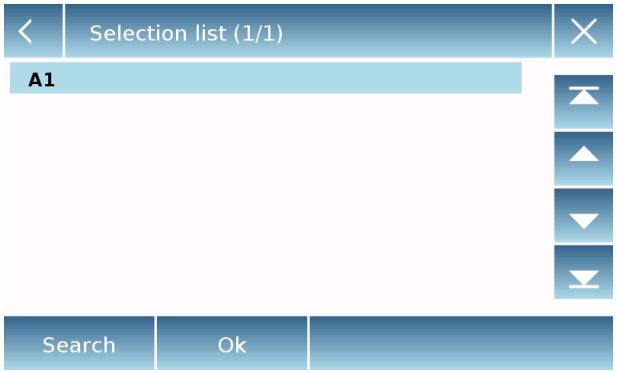
- **ID Balance**
- **ID Project**
- **ID User**

After entering the data, press the "**Save**" key to confirm.

In order to save data, at least one of the three fields must be filled otherwise a “Missing data!” screen will be displayed.




After entering the record you can select it using the "Selection list" or "Selection name" command.



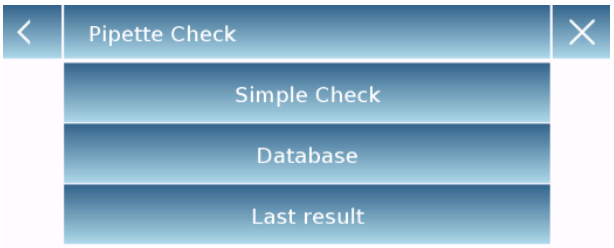

Touch the desired record and confirm with the "**Ok**" key.

**N.B. By entering the "GLP" command in the print setup menu or in the save file, the data set in the "Balance id, Project id, User id" fields will be reported.**

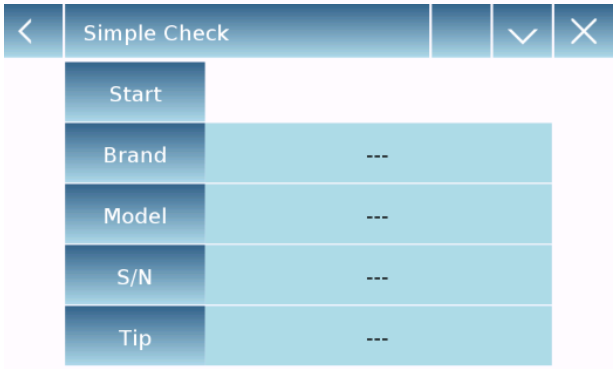
## 8.12 Pipette Check

This function (not available for all models) allows you to check the calibration of the piston pipettes using the gravimetric method. It is possible to choose between different verification methods, at the end of the test a report will be create with all the test data and the indication of compliance or non-compliance according to the standard used.

To access the function from the "Functions" menu, touch the "**Pipette check**" icon.



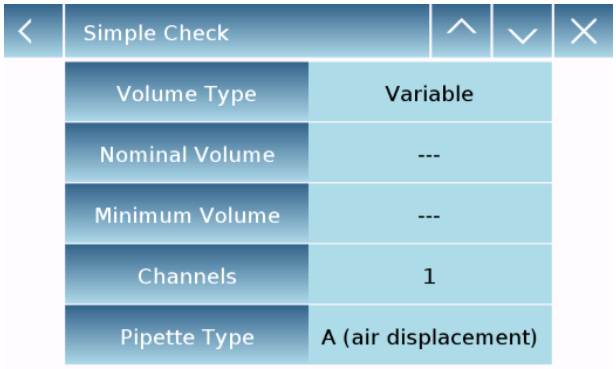

**Simple check:**
This mode allows you to perform a quick test by entering the pipette data and selecting the verification mode.




Once the simple check has been selected, the following pipette parameters must be entered:

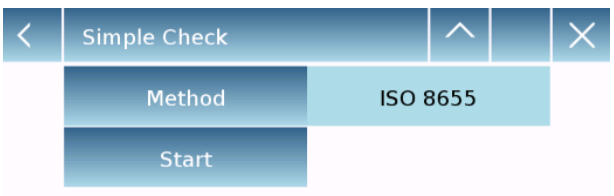
- Brand
- Model
- S/N
- Type of tip

By touching the desired parameter, the alphanumeric keyboard will be activated for entering the value.




Then touch the key  to go to the next page

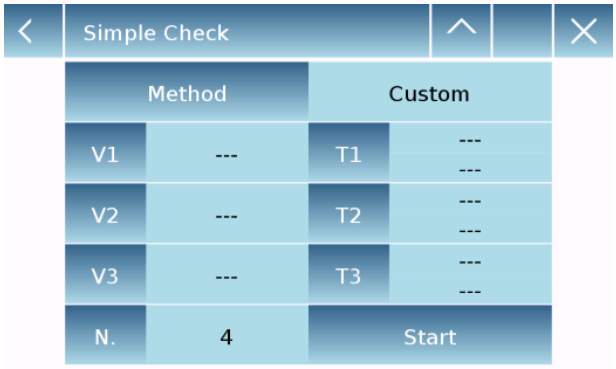
- Select the type of volume: variable or fixed.
- Enter the nominal volume value in µl or ml. (The unit of measurement selected must be equal to the one of the minimum value).
- Enter the minimum volume value in µl or ml. (The unit of measurement selected must be equal to the one of the nominal value).
- Enter the number of channels with a value between 1 and 12.
- Select the type of pipette. Type A air displacement, type D1 direct displacement reusable, type D2 direct displacement disposable.



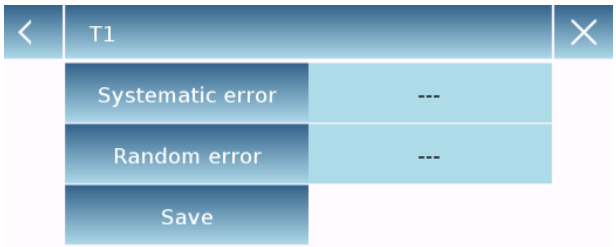

Then touch the key  and select the verification method among those available


Select the desired method.

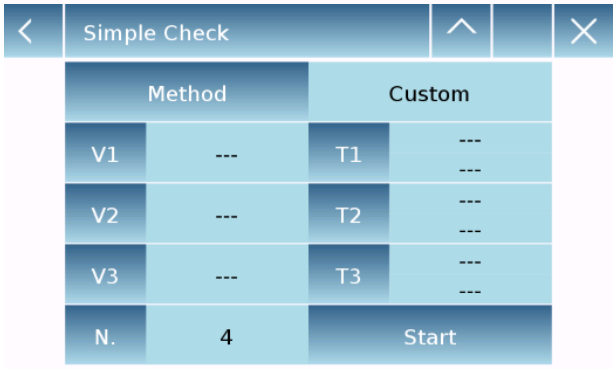
- ISO 8655
- 4x (100% 10%)
- 4x (100%)
- Custom



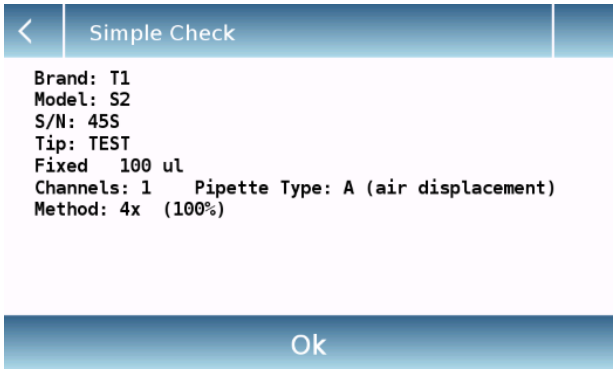

If the custom method is selected, it is possible to decide the number of weighs ("N"), the value of the volumes to be checked up to a maximum of three ("V") and the relative systematic and random error values.




After entering the desired error values, touch the save button to confirm the settings.

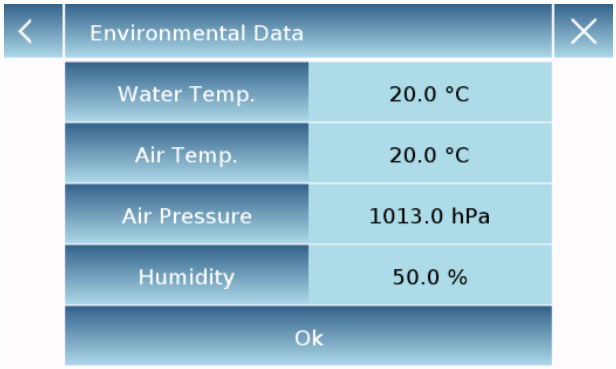



Then touch the "**Start**" button to start the test.




A summary screen will appear.
Here you can check the correctness of all the data entered and the test method.

Touch the key  to return to the parameter setting or the "**Ok**" key to continue with the test.

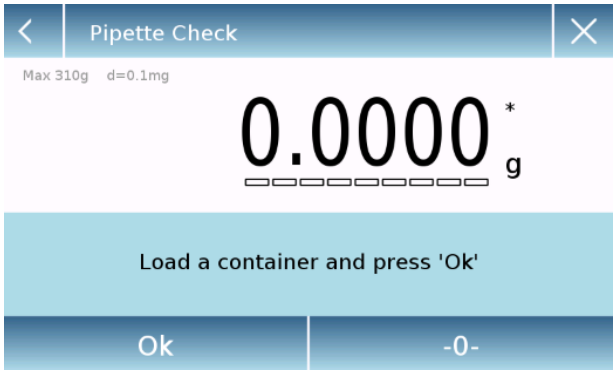



A screen relating to the environmental parameters of the test will be displayed.
Enter the values of:

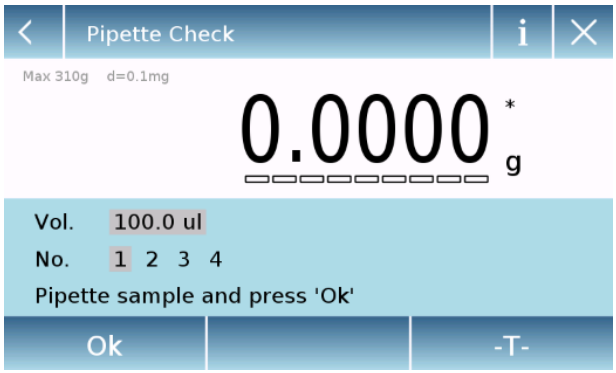
- Water temperature.
- Air temperature.
- Air pressure.
- Humidity value.

Touch the key “**Ok**” to confirm the parameters.

Touch the key  to abort the test, or the key  to return to displaying the inserted test parameters



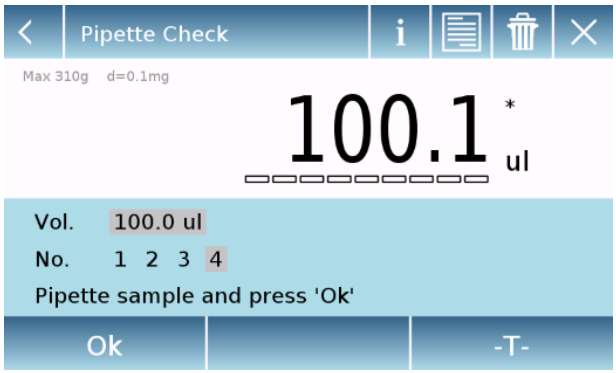

The next screen allows you to effect tare of a container.
Perform zeroing if necessary and touch the "**Ok**" button to continue.




Then the pipette test begins. The number of weighs and the relative volumes vary according to the verification method selected and the type of pipette.
The screen shows the volume being tested and the weighing number.
After dispensing the liquid, press the "**Ok**" key to continue to the next weighing.

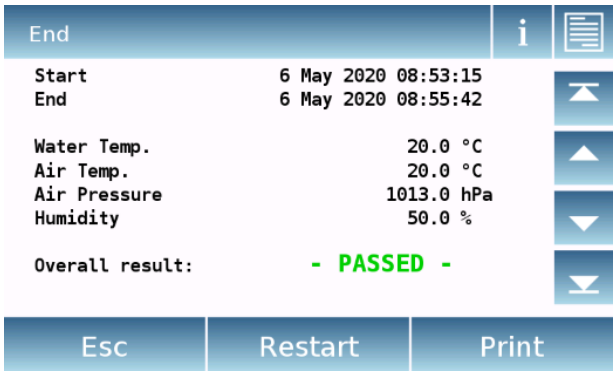
By touching the key  you can view the test parameters you are using.

By touching the key  it is possible to view all the weighs carried out so far.

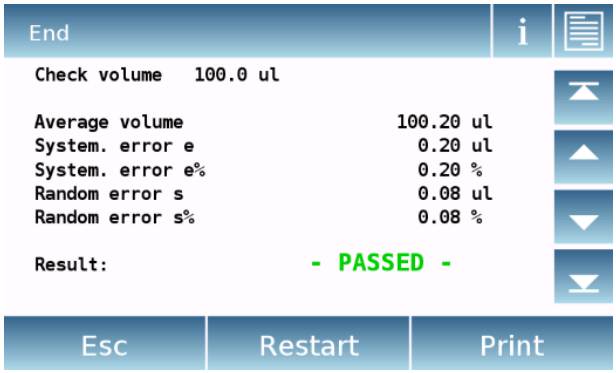



By touching the button  it is possible to delete the last acquired value.

By touching the unit of measure symbol, you can change the weight display from "g" to "ul" and vice versa.




After the acquisition of the last value, a summary screen with the test results will be displayed.




In this screen, by touching the up and down arrows, you can scroll through the various summary screens and view the different error values for each volume tested.

Touch the key  to view the test parameters you have used.

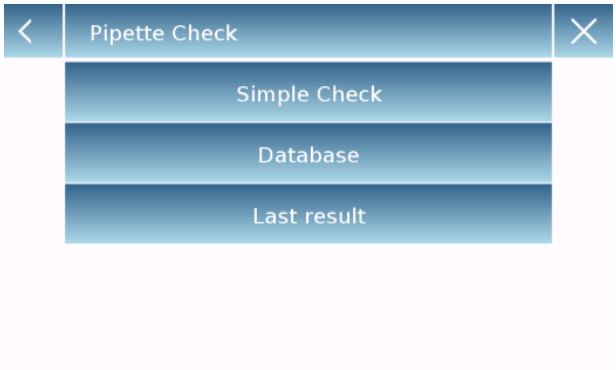
Touch the key  to view all the weighs made.

At the end of the test, the following operations can be performed:

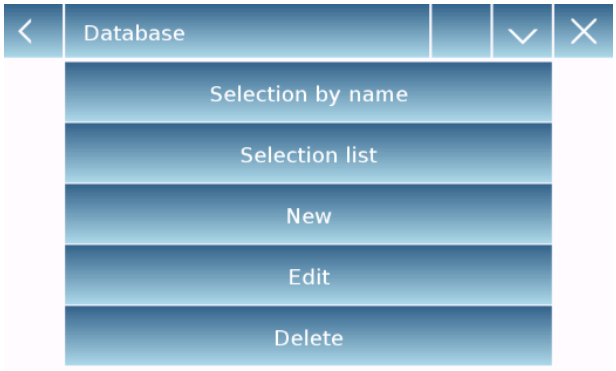
- "**Esc**" key to exit the "pipette check" function.
- "**Restart**" key to perform another test with the same parameters.
- "**Print**" key to print the result.

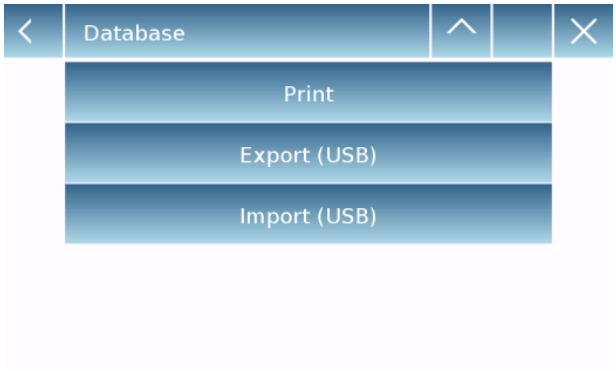
By touching the print button it will be displayed the print menu, here you can choose which data to print and which device to use for the printing.


- Print samples and reports.
- Print reports only.
- Peripheral setup




Selecting the "**Database**" mode is
It is possible to store a list of pipettes with the related test parameters.
Once the list has been created, it will be possible to quickly recall a test, modify it or delete it.




**Database**: touching this command you can access the database management menu related to the "pipette check" function.

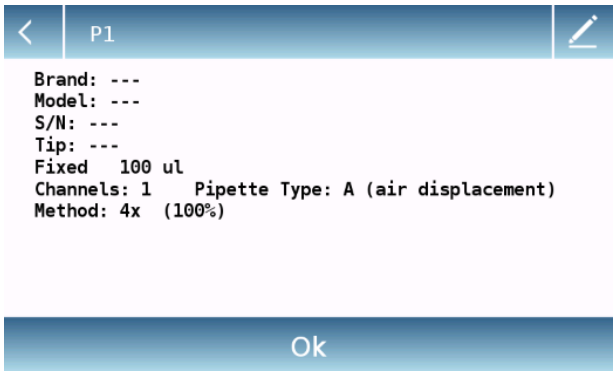
All available functions are described below:

- **Selection by name:** touching this button you can recall a program by entering the corresponding name.
- **Selection from list**: by touching this button you can recall a program by selecting it from a list.
- **New**: touching this button you can insert a new record.
- **Edit**: touching this button you can access the modifiable test parameters.
- **Delete**: touch this button to delete one or more of a previously stored record.
- **Print**: touching this button you can select a record and print it.
- **Export (Usb):** touching this button you can export the database to a USB pen drive.


To insert a new record, touch the "**New**" key, and enter the name of the record you want to create.

After entering the record it will be necessary to enter all the test parameters as already explained for the "simple control" method.
After entering all the required parameters, touch the "**Save**" key to store the new record in the database.


To recall a record, touch the "**select from lis**t" or "**select by name**" button, choose the desired record and confirm with the "**Ok**" button.



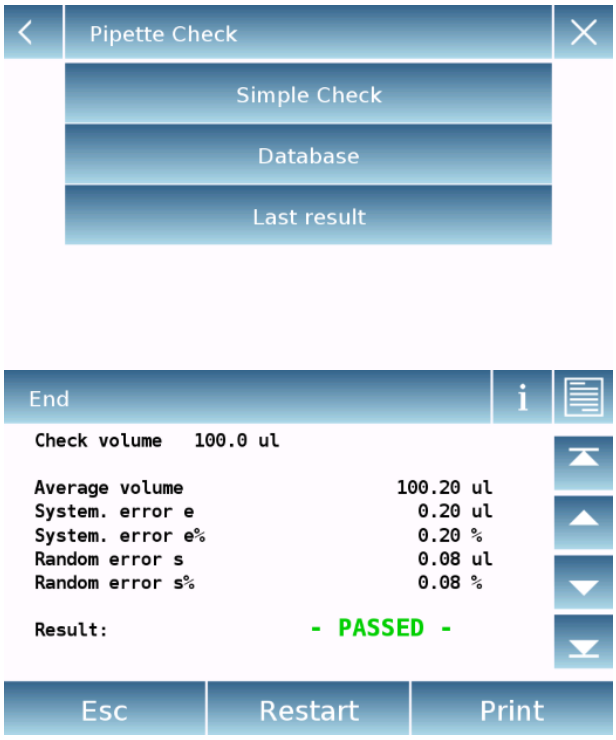

After selecting the desired record, the summary screen will be displayed.

By touching the button  it is possible to temporally modify the test parameters. (Only for the test in progress without modifying them in the database).

Touching the button  you can return to the list of records.

Touching the "**Ok**" key after entering the environmental parameters will start with the test as already explained for the "simple control" mode

From the initial menu screen of the "pipette control function" by touching the "**Last result**" key, you can view the result of the last test performed.
In addition to viewing the test result from this screen, you can do the following:




- "**Esc**" key to exit the "pipette check" function.
- "**Restart**" key to perform another test with the same parameters.
- "**Print**" key to print the result.

**Attention:** The data of the last result remains available until the parameters are loaded to perform a new test.

# 9 Technical parameters

Operating temperature/humidity: +15°C / +30°C
Air humidity 45%-65%, non-condensing.
Power supply: input 110-230Vac, 50/60Hz; output 24V 1A
Voltage fluctuation: ±10%
The models mentioned in this manual are for internal use only.
Maximum working height: 4000m
Pollution degree: Level 2
Installation Category: Category II

## 9.1 Technical Specifications

| **Model** | **Mu-26i** | **Mu-66i** |
|---|---|---|
| Capacity (max) | 2,1 g | 6,1 g |
| Readability [d] | 0,001 mg | 0,001 mg |
| Tare range | - 2,1 g | - 6,1 g |
| Minimum load | 0,1 mg | 0,1 mg |
| Repeatability (std dev) | 0,003 mg (1g) | 0,004 mg (2g) |
| Repeatability (Std Dev) (Max) | 0,004 mg | 0,005 mg |
| Typical Repeatability (Std Dev) | 0,002 mg (1g) | 0,003 mg (2g) |
| Repeatability (Std Dev) Typical (Max) | 0,003 mg | 0,004 mg |
| Minimum Weight (USP) | 10 mg | 10 mg |
| Minimum Weight, Typical (USP) | 8 mg | 8 mg |
| Typical Linearity Deviation | ± 0,01 mg | ± 0,01 mg |
| Eccentricity deviation, typical (test load) | 0,01 mg (1g) | 0,01 mg (2g) |
| Stability time | ≤ 8 s | ≤ 8 s |
| Adjustment | Automatic internal | |
| Typical sensitivity shift | ± 2ppm/°C | |
| Display screen | 5 inch color touch screen | |
| Operating language | Italian, English, Portuguese, German, French, Spanish, Chinese | |
| Interface | RS232, USB host | |
| Weighing pan size | 30 mm | |
| Operating environment | +15 °C - +30 °C , 45-65% relative humidity (non-condensing) | |
| Operating temperature change rate ±0,5°C/h | ± 0,5 °C/h | |
| Relative humidity change rate ±2%/h | ± 2%/h | |
| Power supply (balance) | 110-230Vac, 50/60Hz; output 24V 1A multi plug | |
| Power supply (ion generator) | 110-230Vac, 50/60Hz; output 12V 1A multi plug | |
| Standard accessories | Ionizer, E2 weight (2g), tweezers, gloves | Ionizer, E2 weight (5g), tweezers, gloves |
| Size | 480(D) x 165(W) x 205(H) mm | |
| Windshield Inner Diameter | 165 mm | |
| Distance weighing pan/top windshield | 75 mm | |
| Indicator size | 173(D) x 180(W) x 92(H) mm | |

# 10 Warranty

- The warranty period is 24 months from the date of purchase as evidenced by the tax receipt of the product or its delivery document.
- The warranty covers all parts that should be defective originally. It does not cover damaged mechanical and electronic parts due to improper installation, tampering, or improper use.
- The warranty does not cover damage caused by shocks, fall of the balance or fall of objects on the weighing plate.
- The transport to and from the Service Center is the responsibility of the customer.

# 11 Disposal

If the packaging is no longer used, it can be delivered to the local waste disposal center. The packaging is made entirely of non-polluting materials, recyclable as valuable secondary raw materials. Discharged batteries should not be disposed of in normal domestic waste. Drop them into the appropriate collection containers. In case of scrapping of the balance, call the local authorities. Remove the batteries before scrapping the unit.

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