These dead weight testers high performance incorporate a calculator : with dynamic visualization of the position of the piston, with automatic display of the pressure generated by the dead weight depending on the sensors : temperature, atmospheric pressure, with a connection for transferring data on a computer allowing full traceability.

This product is essential for the calibration of high-precision

Functionality of the calculator :

As soon as the calculator is powered, the user has the choice between different programs :

- **F1: Measurement** : The measurement function is used to launch the calibration process and define the acceptable criteria, to perform pressure measurements by assisting the operator.
- **F2 : Adjusting/visualization** : The display function is used to display a bargraph representing the position of the piston.
- **F3 : Settings test** : The settings and the tests make it possible to modify certain parameters such as gravitation. And to display in real time the values obtained by the sensors.
- **F4 : Configuration dead weight**: This function is used to configure various parameters of the DWT such as: entering the values of the set of weights after calibration, calibrating the sensors, modifying the time, the date and the language of the calculator. The manufacturer adjustment function is reserved for AREMECA.
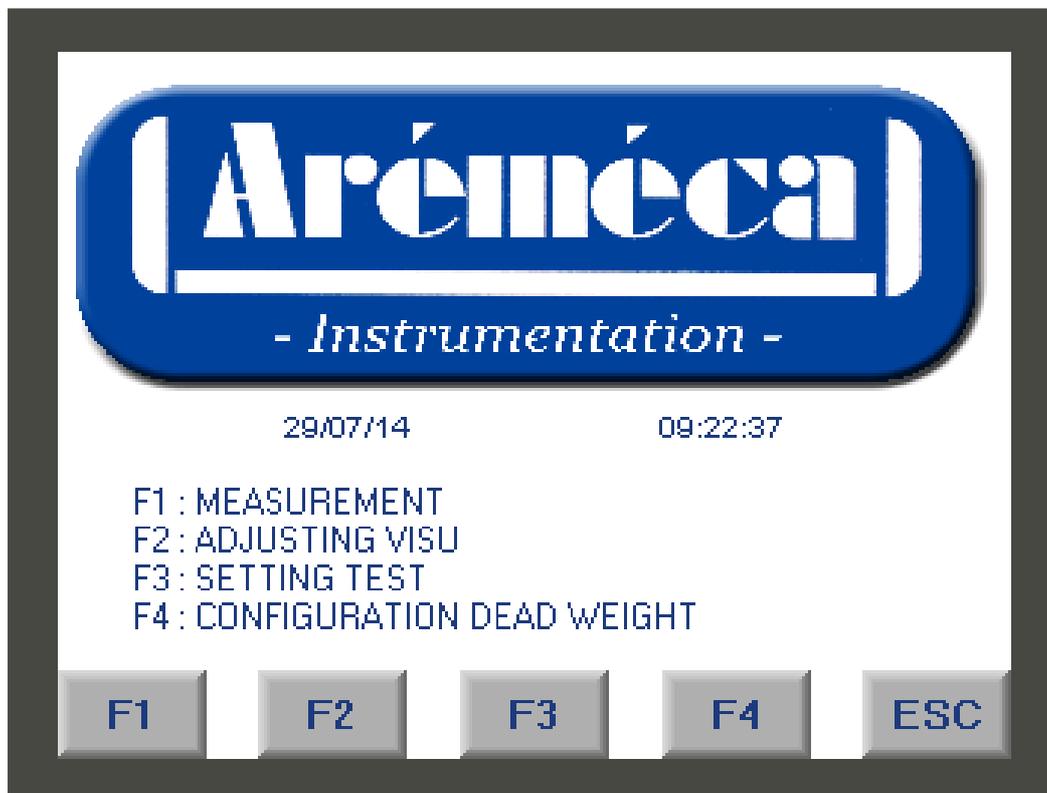
To configure the calculator with the language of your choice : see function F4 chapter [e) Special functions]

1- Functionality button F1

The function F1 is used to define the calibration criteria and to launch the measurement process with operator assistance, then to produce a certificate of calibration and to carry out a leak time.

Upstream, the operator must ensure that the calculator parameters are properly informed (see Functionality of the button F3). These parameters are entered during the manufacture of the DWT, but can be modified if necessary.

I. Realization of Measuring

On the home screen, press the button -> "**F1**" on the screen.

1st operation : Configuration of the test on the device to be controlled
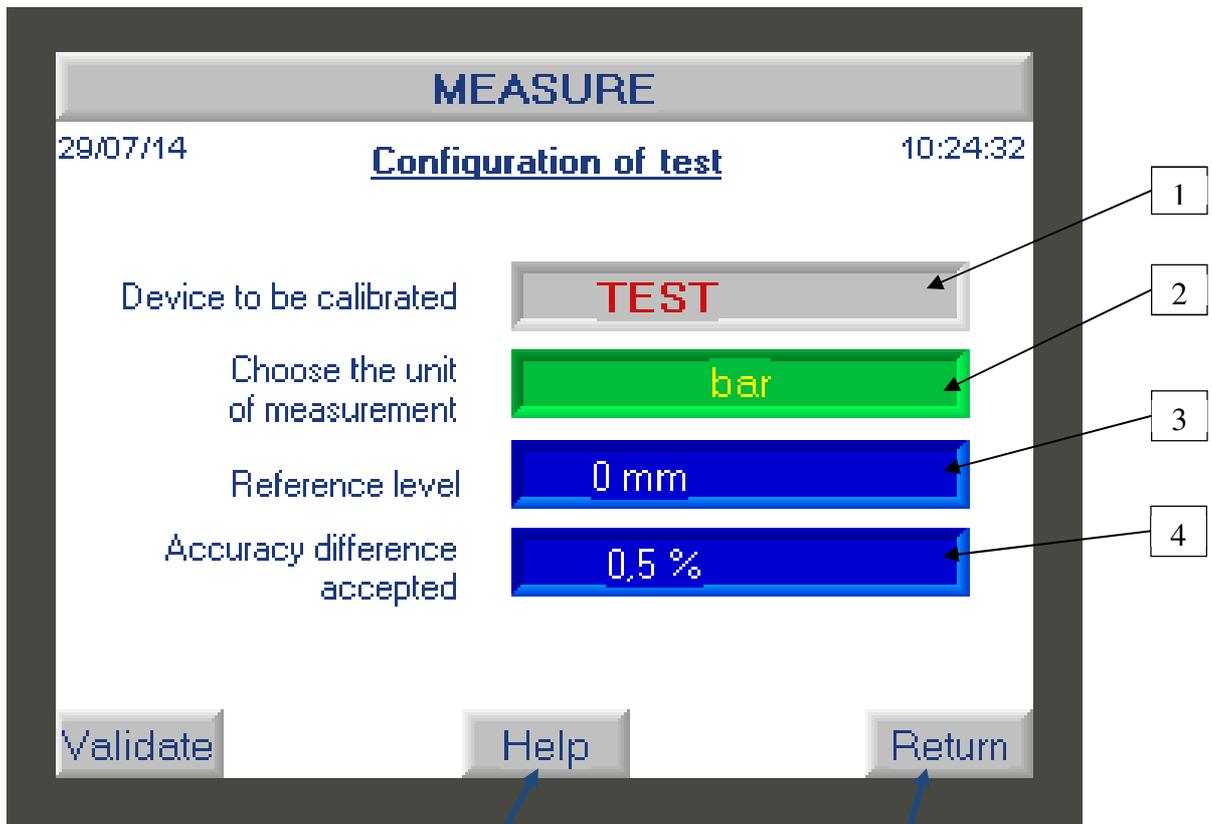
The "**help**" button is used to display additional information concerning the active screen.

The "Return" button allows you to return to the previous screen.

On this screen, the operator must :
- a) Enter the name or reference of the device to be calibrated (1): to do this, click on the field "Test" field -> a new window opens giving you access to an input keyboard
- b) Choose the unit of measurement (2) -> click on this field as many times as necessary to scroll through the units of measurement.

Note: the advantage of the calculator is that you can decide to work in a different unit of your weight set. The calculator will do the conversion. Example: your weight set is in bar, but the measurements/results will be in PSI.

- c) Enter the distance at which the device to be calibrated is located in relation to the reference level (3) -> click on the field to enter the level value of the device if necessary.
  Note: the reference level is indicated on the scale by the indicator positioned on the housing.

Reference level of the DWT
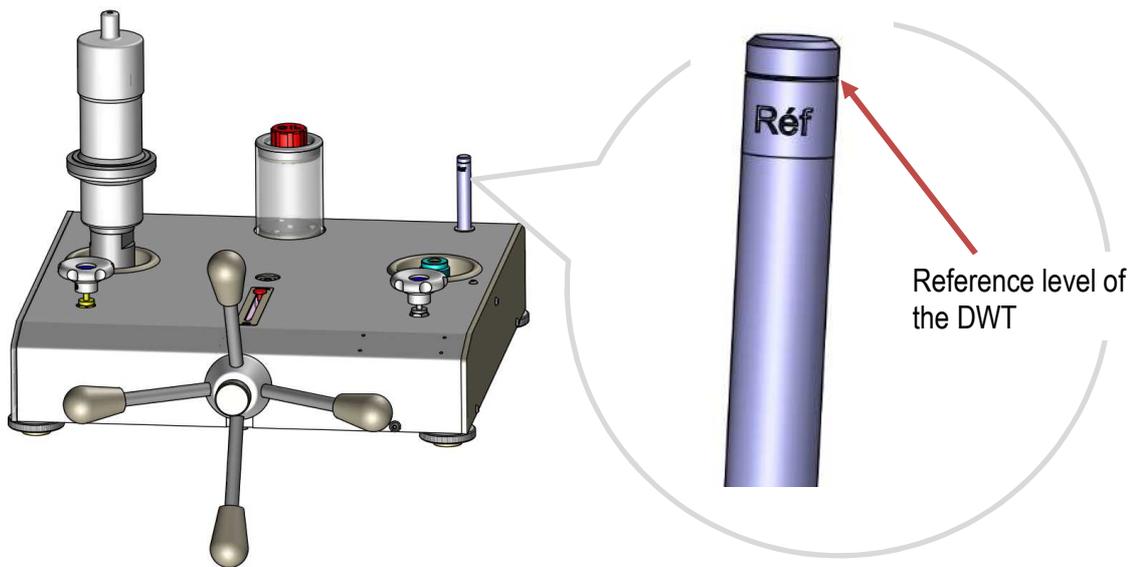
- d) Indicate the measurement deviation that you tolerate (4) -> click on the field and enter the desired value. (ex.: 1%)

Once all the fields have been filled in, press the "validate" button to go to the next screen.

<u>2nd operation : Choice the set of weight</u>

On the top banner of this screen you will find the following information :

Here appears the unit of the set of weights :
-1 : BAR
-2 : PSI
-3 = Kg/cm²
-4 = Pa ou KPa etc..

Here appears the serial number of your dead weight

Here appears the name or the reference of the device you are testing (field filled in on the previous interface)
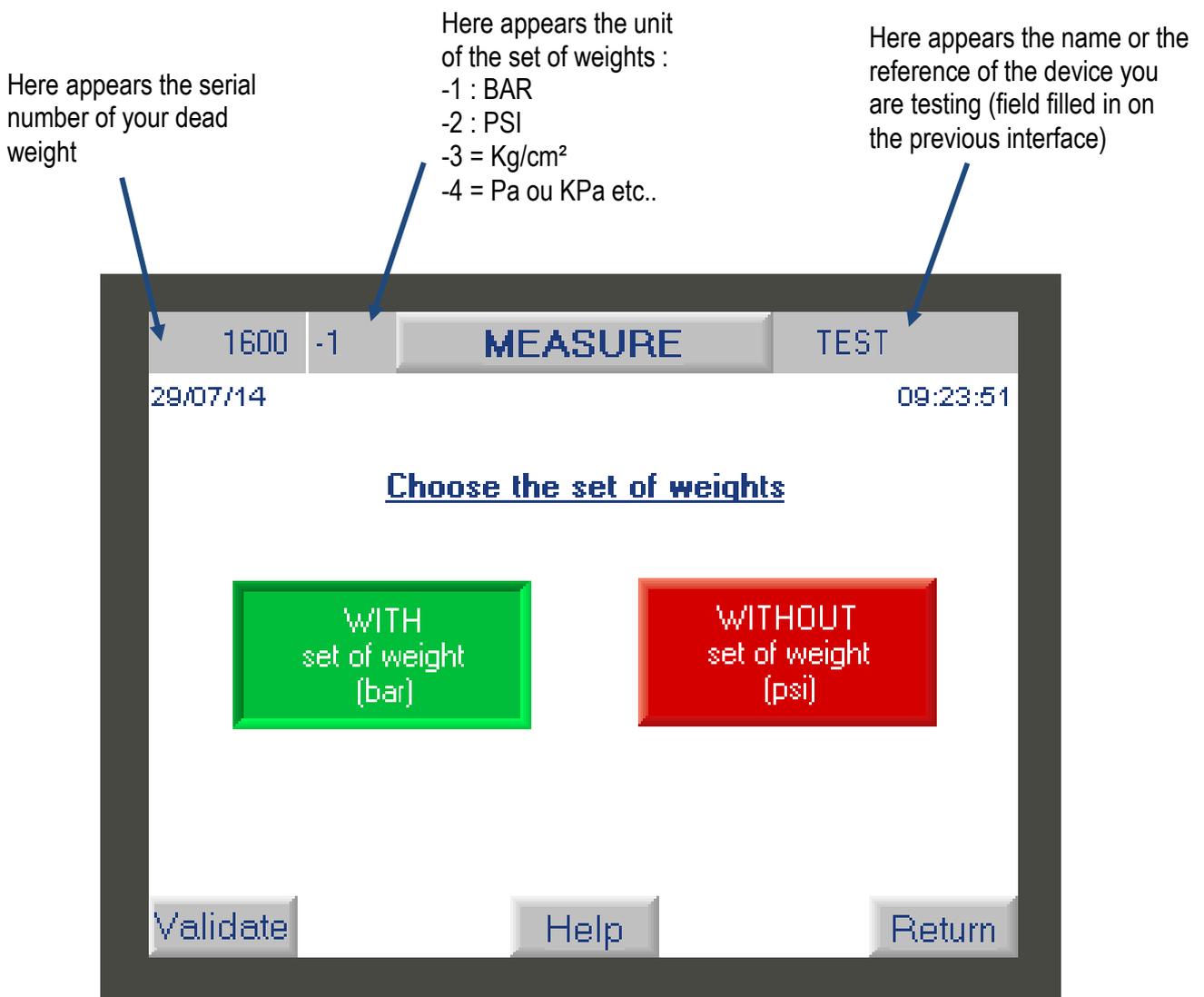
Please indicate the unit of your set of weight BAR or PSI : click on the appropriate unit to validate it. It should appear green.

When manufactured, the set of weight of the DWT can be can be in BAR or PSI, and some DWT have two sets of weights. The operator therefore has the possibility here to select the set of weights he wishes to use.

IMPORTANT: Each DWT has its own set of weightes, and it is impossible to interchange a set of weights with another DWT. When manufacturing a DWT, we adjust the set of weights according to the criteria requested such as gravity, the desired unit of measurement. But also depending on the piston. In other words, 1 set of weights works hand in hand with a piston, they form an inseparable pair.

Press the "**validate**" button to go to the next screen.

3rd step: entering the desired pressure value
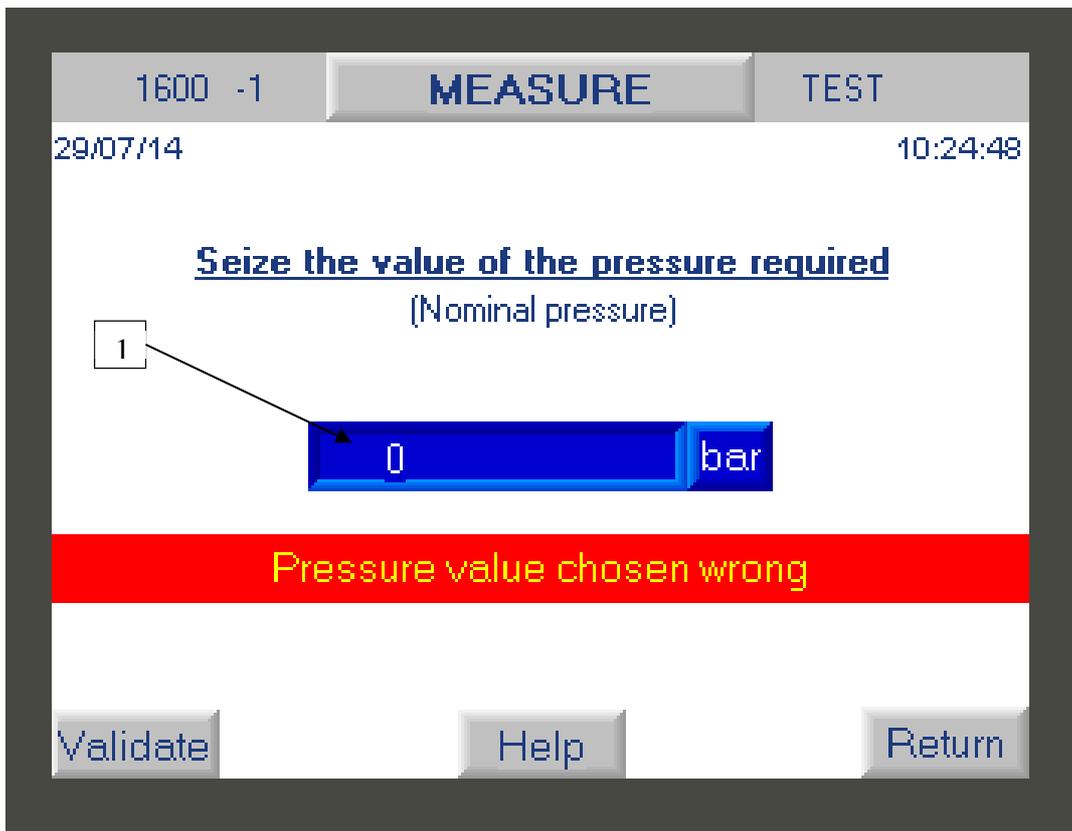
The user must enter the pressure value of his first measurement point. Please note that this value must be within the measuring range of the DWT

Click on the blue field (1) to access the numeric keypad and enter the value, then confirm it with the white arrow key.

If you inadvertently enter a value above or below the measuring (EM), then the controller will display the message "incorrect pressure value chosen". The value entered will only be accepted when the requested pressure value enters the measuring.

After entering the pressure value, press the "**validate**" button to go to the next screen.

4th operation: Configuration of the stacking of the weights
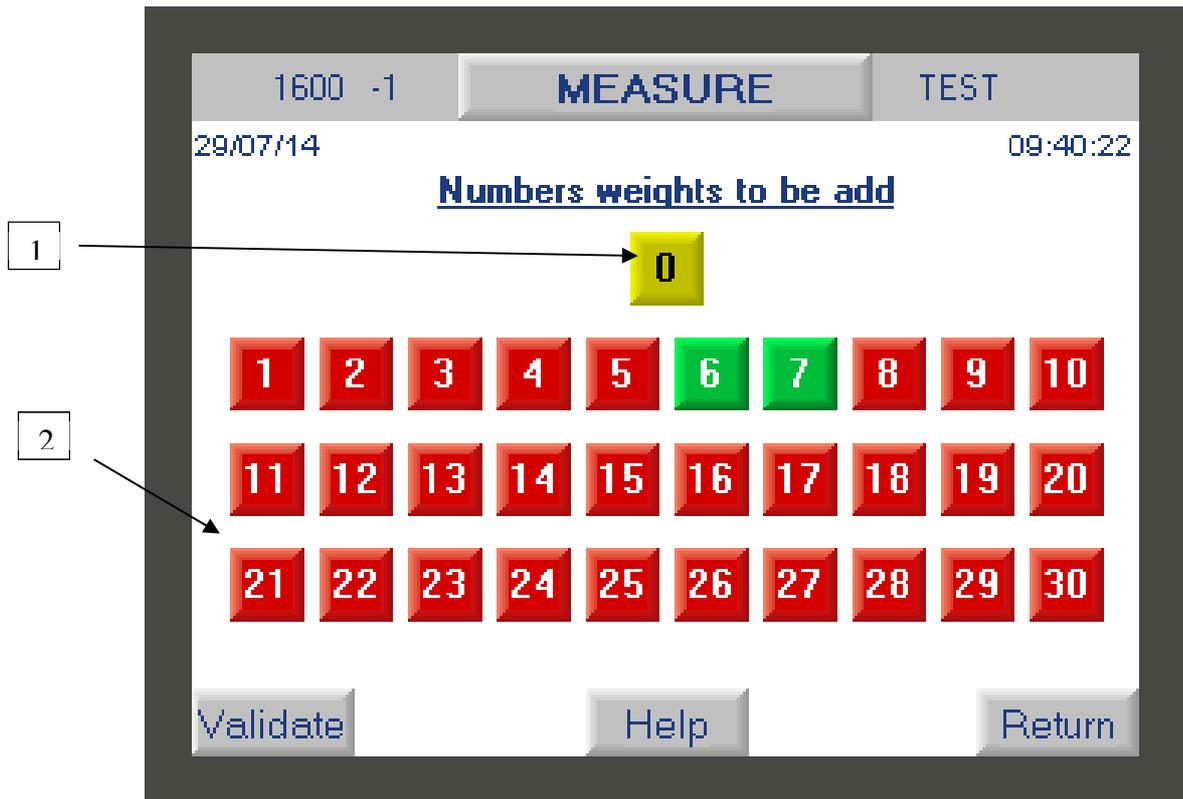
This screen displays all the weights to be placed on the bell of the DWT in order to obtain the desired pressure value (entered previously).

Weight **0** in yellow color (1) corresponds to the moving assembly, its weight rest and its adjustment crown which must always be present to perform the measurements.

The weight numbers displayed in GREEN (2) correspond to the weights that you must position on the bell to obtain the desired pressure. Weight numbers displayed in RED are weights that should not be used.

NOTE : Each weight is identified with a serial number :   *XXXX – X - XX*

Serial number of the DWT and piston

Determines the unit of the set of weights

Weight number in set of weight
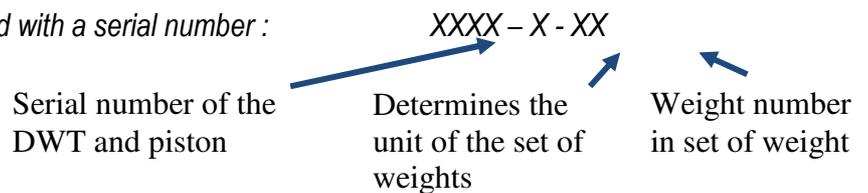
*ex : weight number 1 = XXXX – X – **01***

IMPORTANT: Weights must be handled with care. It is important not to hit the bell with the weights during installation so as not to break the piston.

Check that all the weights requested are in place on the weight rest and that they are rotating.

Press the "**validate**" button to go to the next screen.

5 operation : test result

This screen displays the pressure value obtained with the weights added in the precious step.
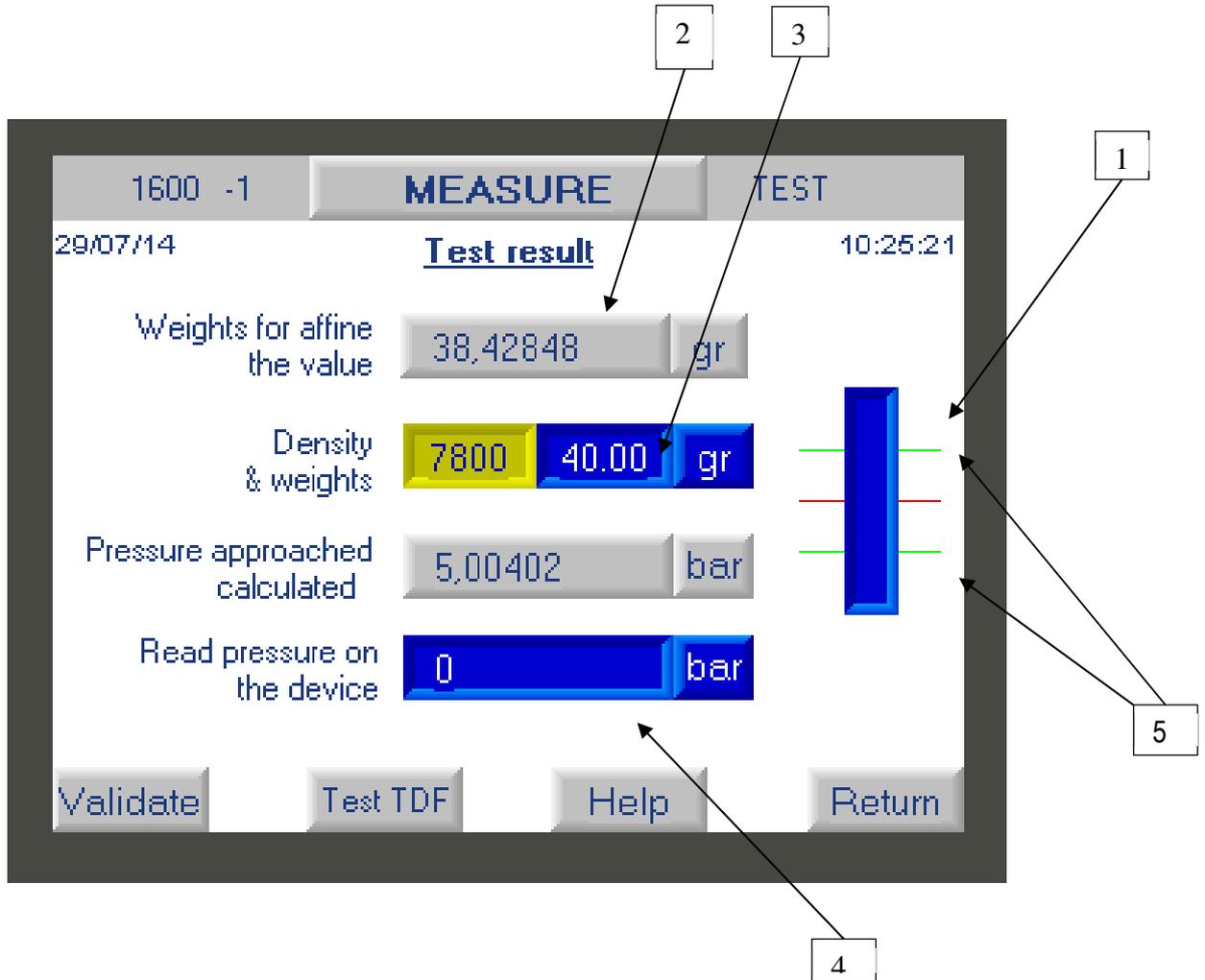
a) Before validating the elements present on this display, the operator must ensure that the DWT is well balanced. To do this, click on the bargraph diagram (1) to enlarge it. Check that the piston is in the measurement range between the two green marks (5)

b) The calculator displays the actual value obtained. If you want to approach the exact value requested, you can add fine increment weight on the DWT corresponding to the mass value indicated (2). Note : We offer an optional set of intermediate weights and/or fine increment masses from 1mg to 50g.

If you add weights, you must enter the mass value that you added in field (3), remembering to specify the value of the density of the small weight
- For weight less than 1g ⇨ 2800
- For weight above than 1g ⇨ 7800

At this time, the new value generated pressure is recalculated.

c) You must then enter the pressure value read on the device to be calibrated in field (4).
Click on it to access the numeric keypad.

d) Press the "**validate**" button to go to the next screen.

6th operation : Result/Data recording

Once the previous step has been validate, the calculator will check that the difference between the calculated pressure and the reading pressure on the device is well within the tolerance entered in operation 1

If the result obtained is out of tolerance, the calculator will display an error message

The operator will thus be able to check that he has not made an operating error (wrong mass, error in entering the value obtained, etc.)
➔ If an error has been made, then he can click on "**return**" to correct it.
➔ If there is no error, he clicks on "**validate**"

This step ensures that the error is related to a deviation from the device under test and not to improper handling.

b) If the result entered by the user corresponds to the tolerance then a new screen will be displayed
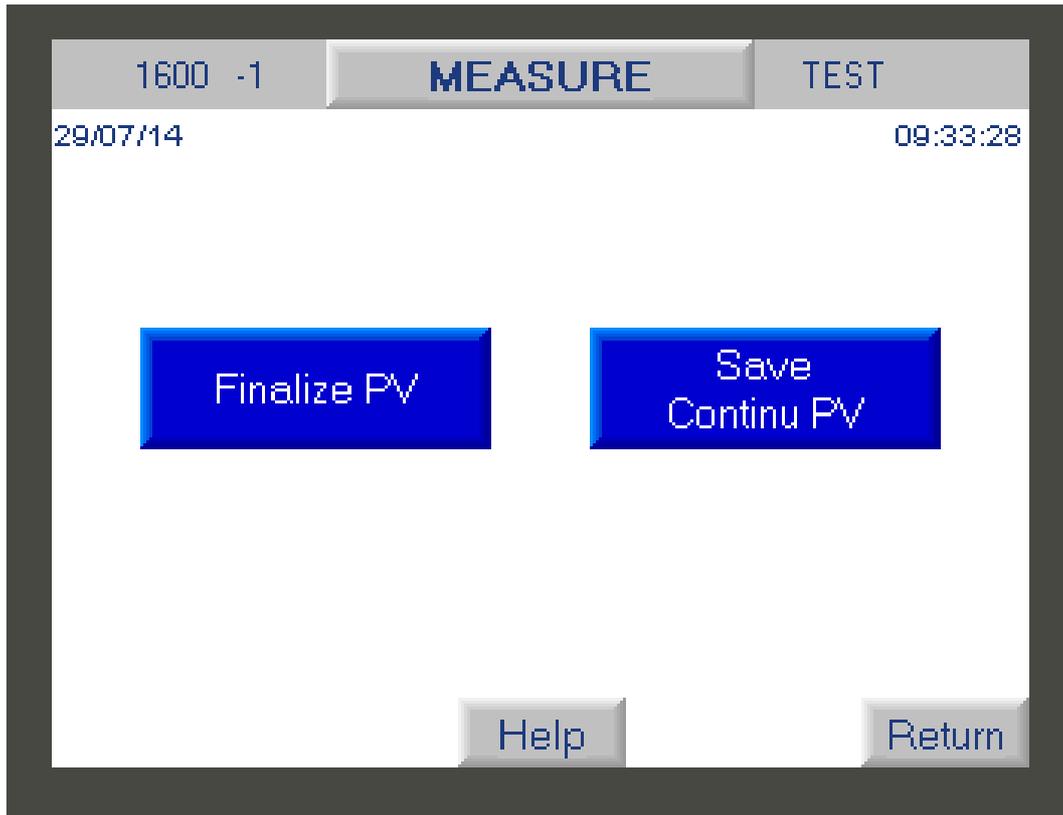
The operator will have the choice either to click on :

- "**Save-Continue PV**" : to save the result of the first measurement made and return to the first screen in order to enter the second desired pressure value (2nd measurement point) and so on to perform all the points of the measure.

- "**Finalize PV**" : saves the measurements made and returns to the main screen of the F1 button.

II. Do the leakage time of the dead weight.

You can perform a leak time during a measurement ("F1" key) to check that your scale has no leaks and is working correctly.
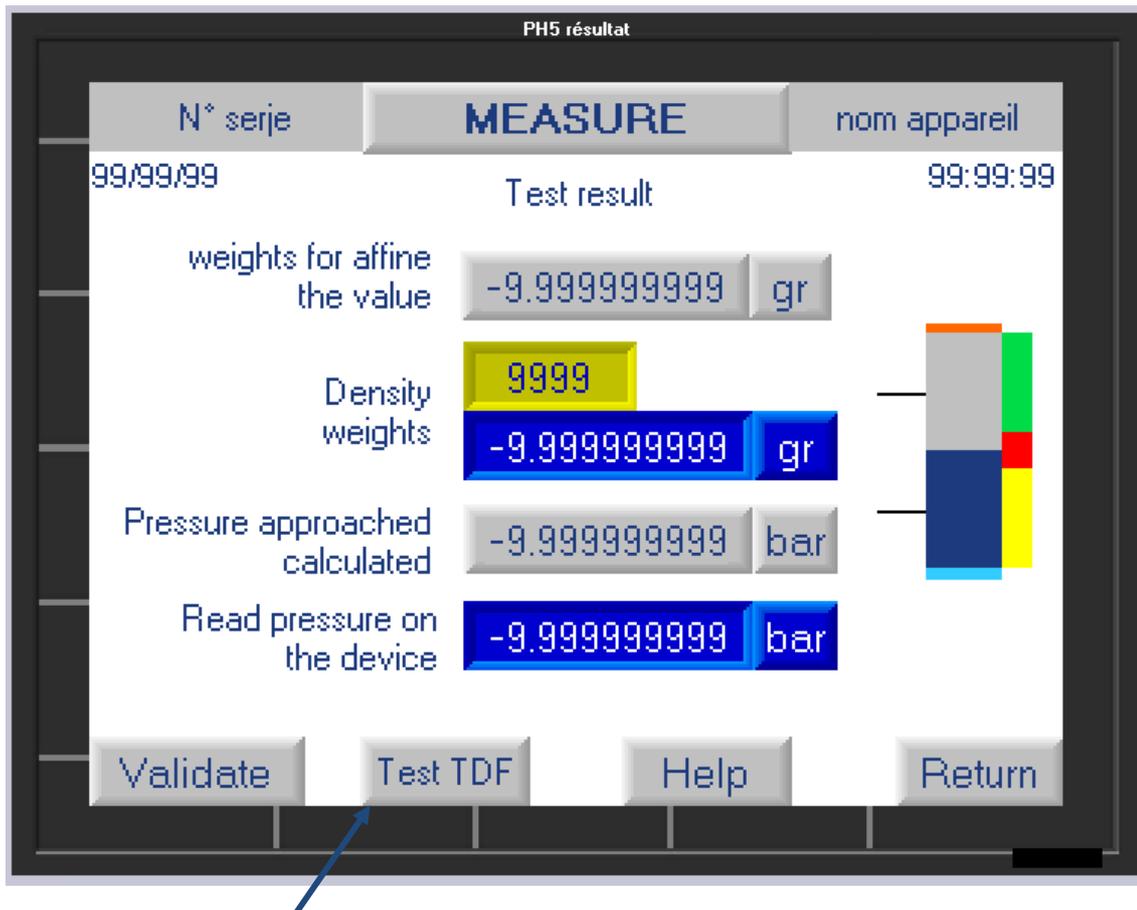
The user can click on "**Test TDF**" then the calculator will display the following screens.
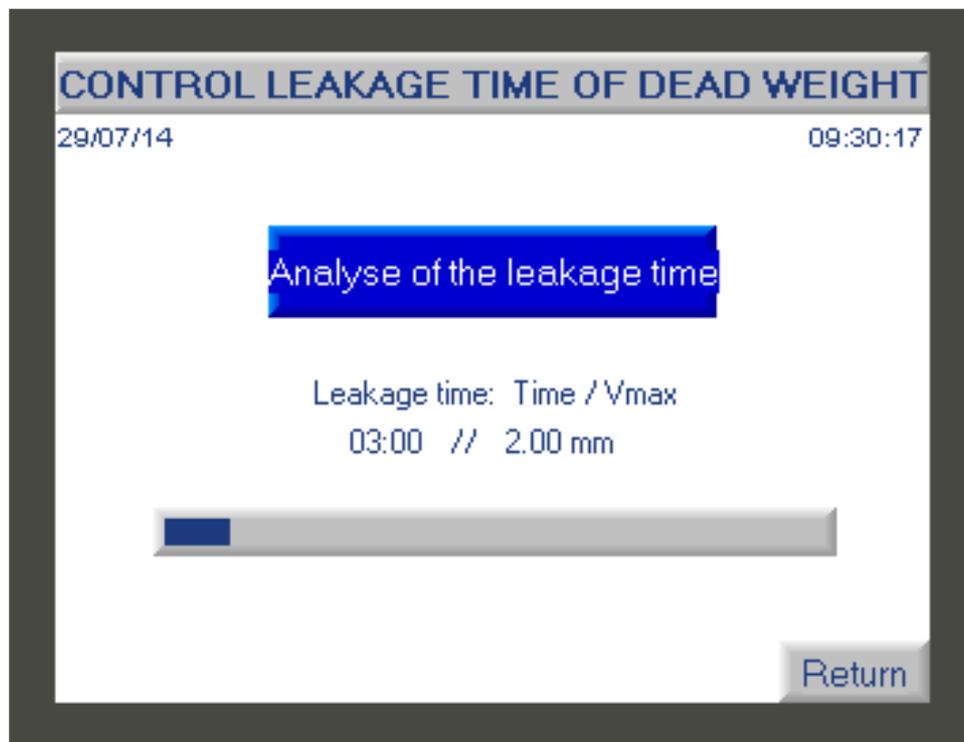
This screen analyzes the leakage time of the dead weight by comparing its descent speed with the information seized in the manufacturer settings. (see paragraph **3 - button Functionality F3**).

Leakage time result :
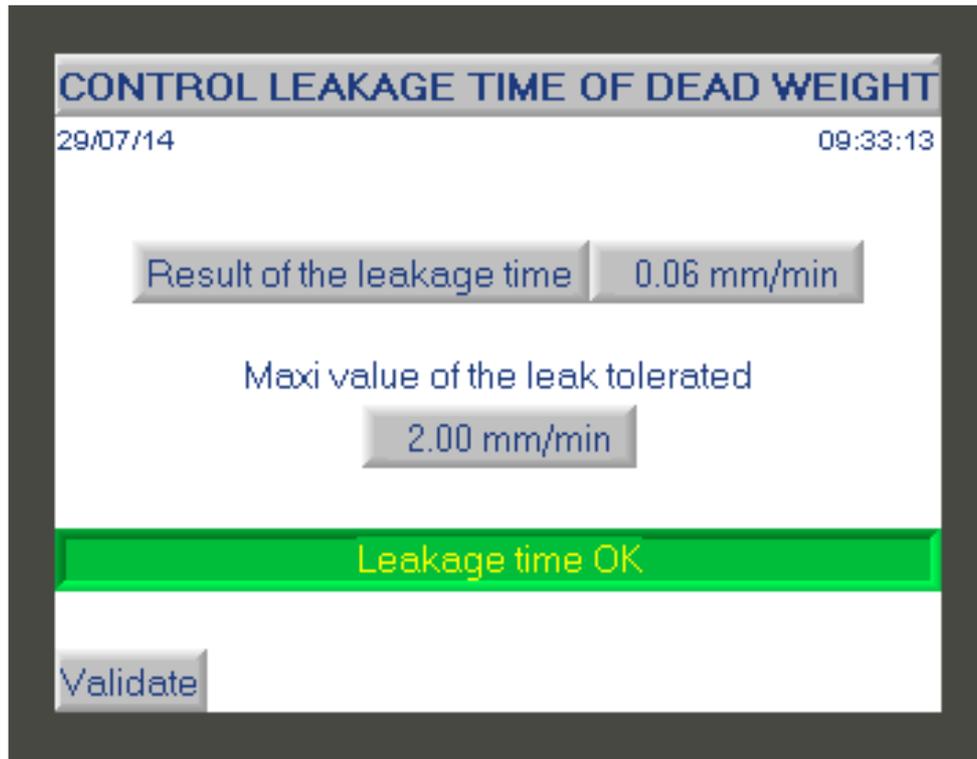
The acceptable leakage time value depends on the DWT model and is defined by AREMECA.

If the leak time is not good then the user will have to check that there is no apparent leak linked to a bad connection, a damaged seal, oil leak, bad purge etc...

If the leak persists, then contact our after-sales service (contact details given on the cover of this manual) or contact us via our website: www.aremeca-instrumentation.com

2 - Button functionality F2

The visualization function allows you to display a bargraph representing the position of the piston and to check that the DWT is well balanced.

To access this function press the "F2" key on the home screen.

A new screen is displayed with a bargraph representing the position of the piston in the DWT.
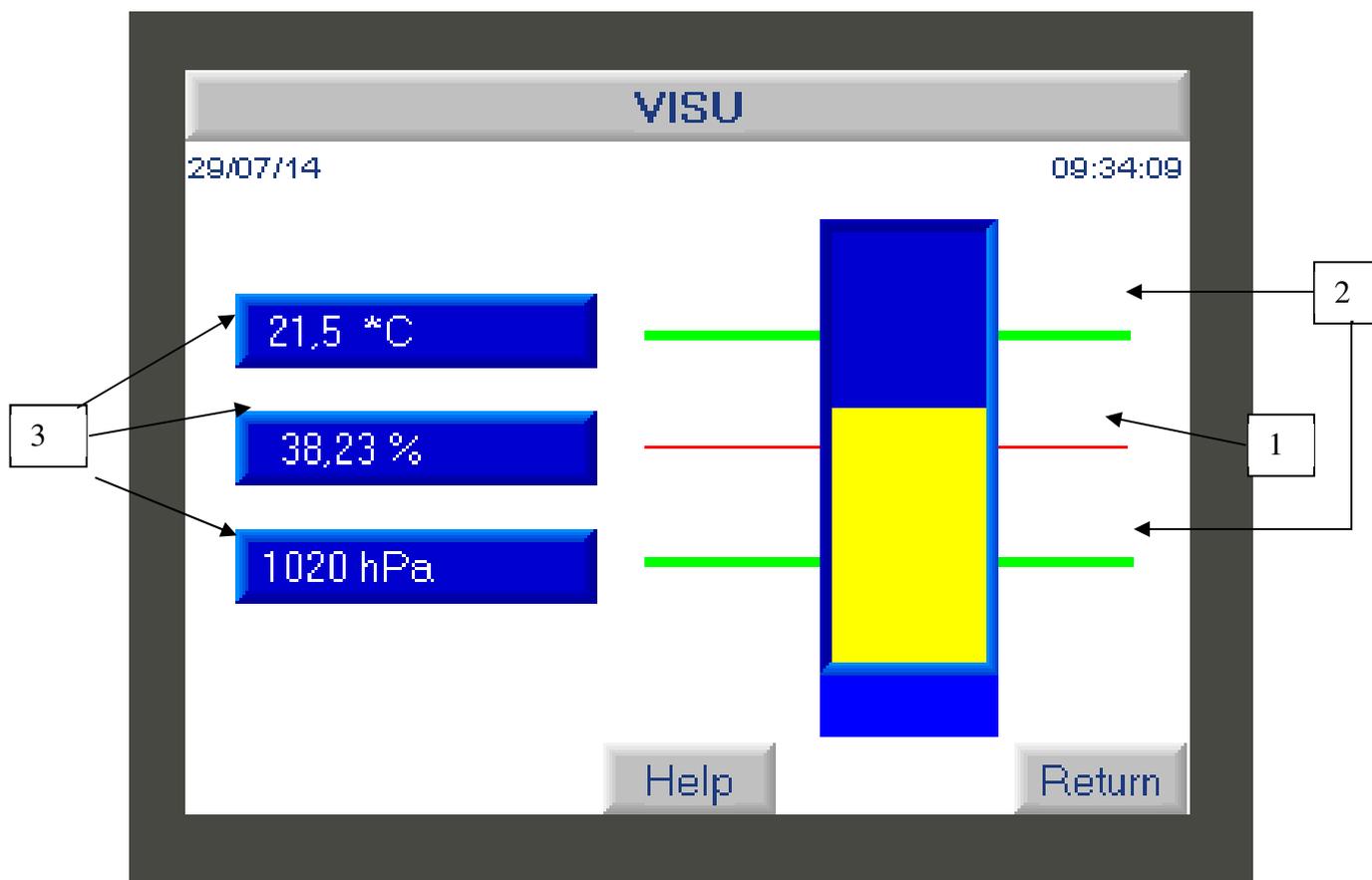
If the user presses the button "**F2**" on the screen then he will see a bargraph representing the If the gauge (yellow color) stabilizes on the red mark (1) then the DWT is in perfect balance. The value is acceptable if the gauge is between the 2 green marks.

If the gauge is beyond the two green marks (2) then the value of the pressure generated is distorted.

This screen also displays the values obtained by the sensors: temperature, atmospheric pressure (3). These values can be frozen if necessary.

Press the "**Return**" button to move to the home screen.

3 - Button functionality F3

This Test settings function allows access to the test settings and to modify certain parameters such as gravity. It also allows real-time display of the values obtained by the sensors.

I.   Variable parameters to be entered

On the home screen, press the "**F3**" button on the home screen, to modify the following parameters :

- the local gravitational acceleration (1).
- the altitude of the device to be calibrated (2).
- the time of the leakage time (3) and the distance that the dead weight should go up this time. The leakage time is defined by the manufacturer. See OIML standard

To modify one of the variable parameters, click on the blue field you wish to modify to access the input keyboard.
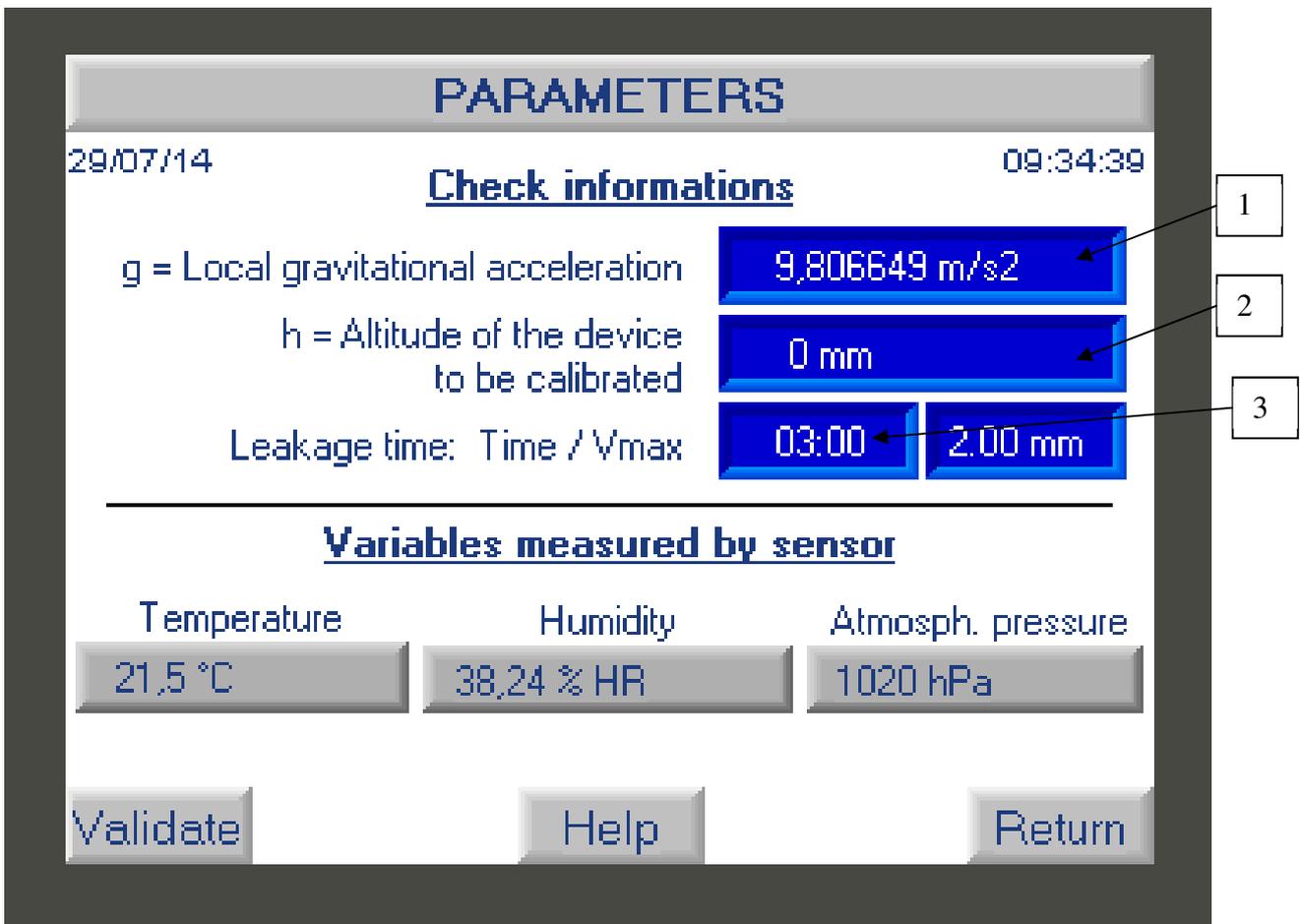
II.   Variables measured by sensor (ambient data).
The screen displays the variables measured by the various temperature, humidity and atmospheric pressure sensors. These values can't be changed.
Note: You have the option of checking the conformity of the sensors with function F4

Press the "**Validate**" button to save the new data or "**return**" to return to the home screen.

4 - Button functionality F4

This function is used to configure various parameters of the DWT such as: entering the values of the set of weights after calibration, calibrating the sensors, carrying out a calculation test, modifying the time, the date and the language of the calculator. The manufacturer adjustment function is reserved for AREMECA.

IMPORTANT: Access to these functions requires entering a password

On the home screen, press **F4** to access the different functions :

Dead weight setup
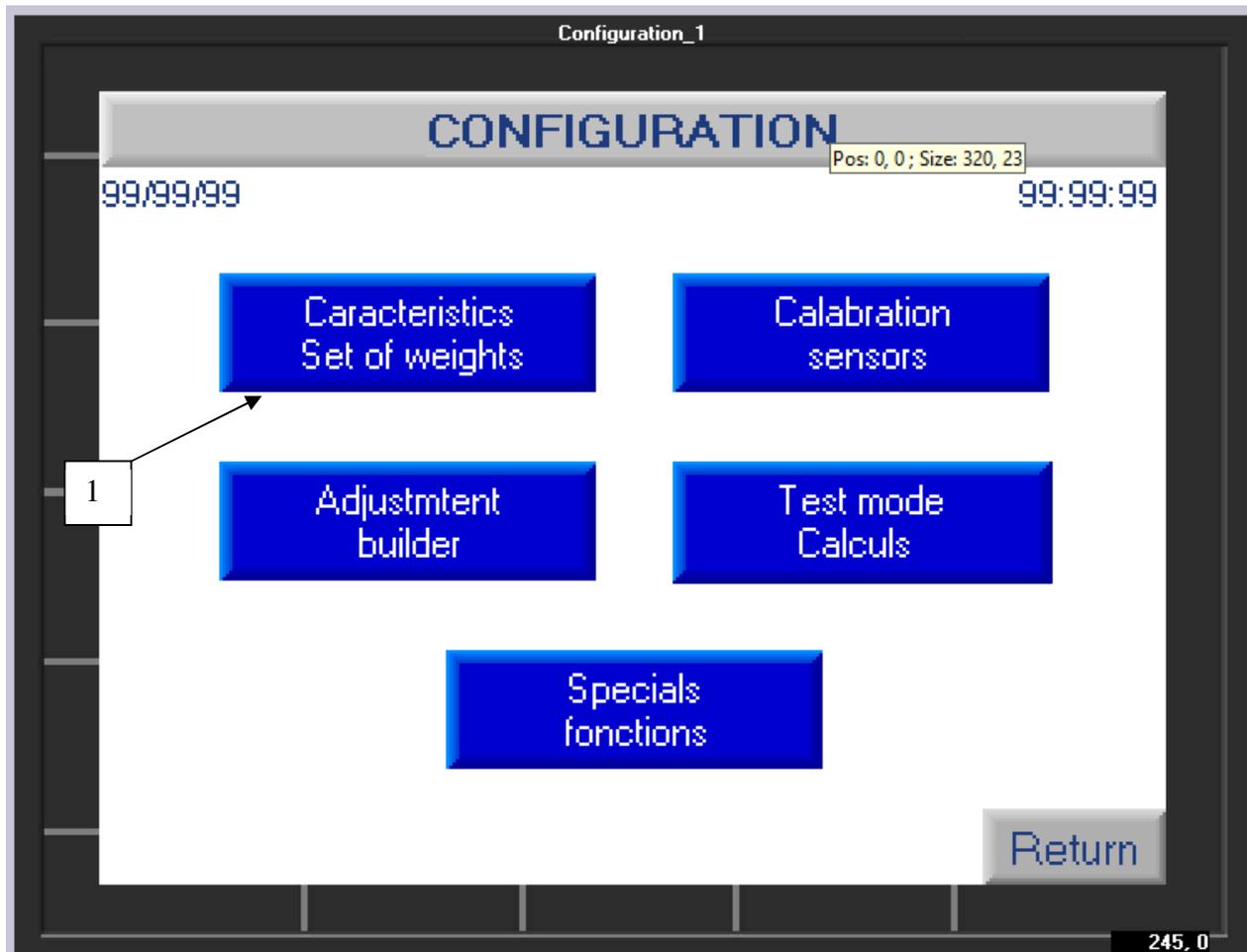
a) Characteristics of the set of weight and of the piston following a new calibration
During the manufacture of your DWT, we manufacturer, entered the weighing values of your weights, the characteristics of the piston etc…. If you calibrate again your DWT, you will have to check/correct these values with those indicated on your new COFRAC or DKD calibration certificate, etc.

To access the data entry, click on the button "**Characteristic set of masses**" (1) + enter access code **1993**

A new screen is displayed with 2 options :
- piston data
- Data concerning the set of weights

a) Piston data

if you click on this button, you will see the following screen :

Previous   Next
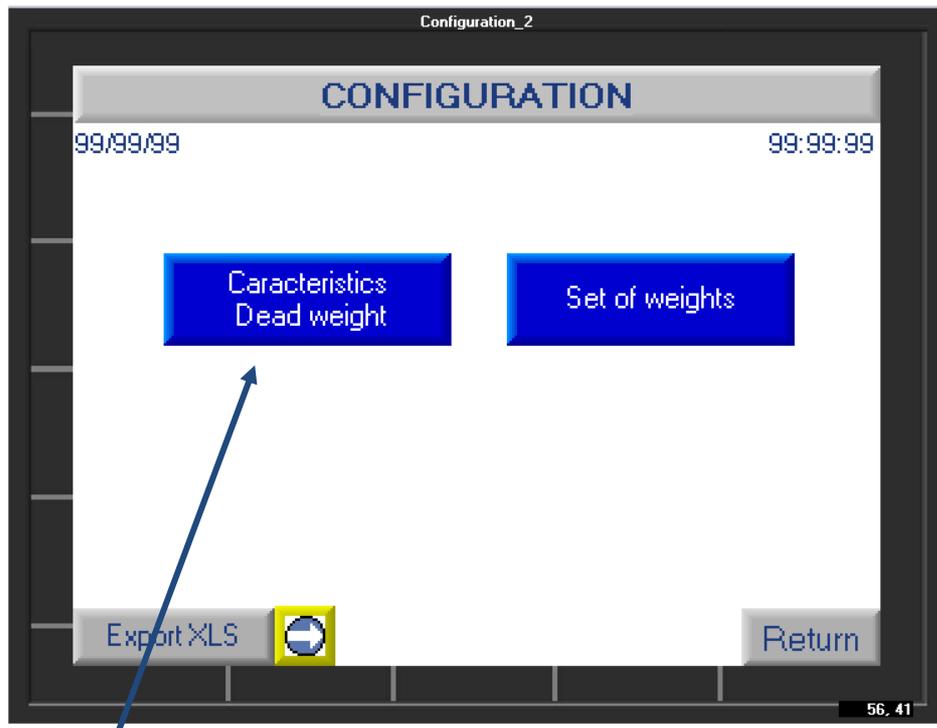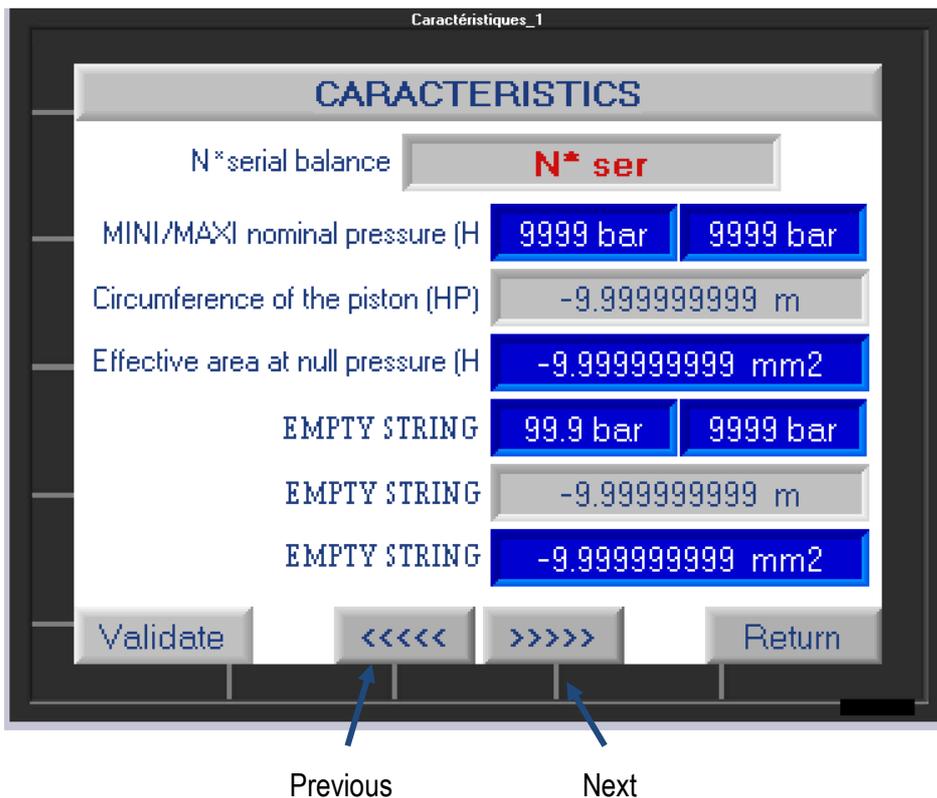
On this screen you will find the following information :
- The serial number of your DWT
- The measuring range of your DWT
- The circumference and section of the piston
- The nominal range of the piston

Note : For double piston DWT (ex: BH2-1200B DP) you will have access to the values of the BP and HP piston

Values in blue can be edited, values in gray are not editable. To modify a data, click on the blue area to access a numeric keypad, enter the value and validate.

Click on the "**next**" button to access other modifiable values such as the coefficient of linear expansion of the piston + sleeve etc.

If you have modified parameters remember to "**Validate**" otherwise press "**Return**"

     a)   <u>Data concerning the set of weights :</u>
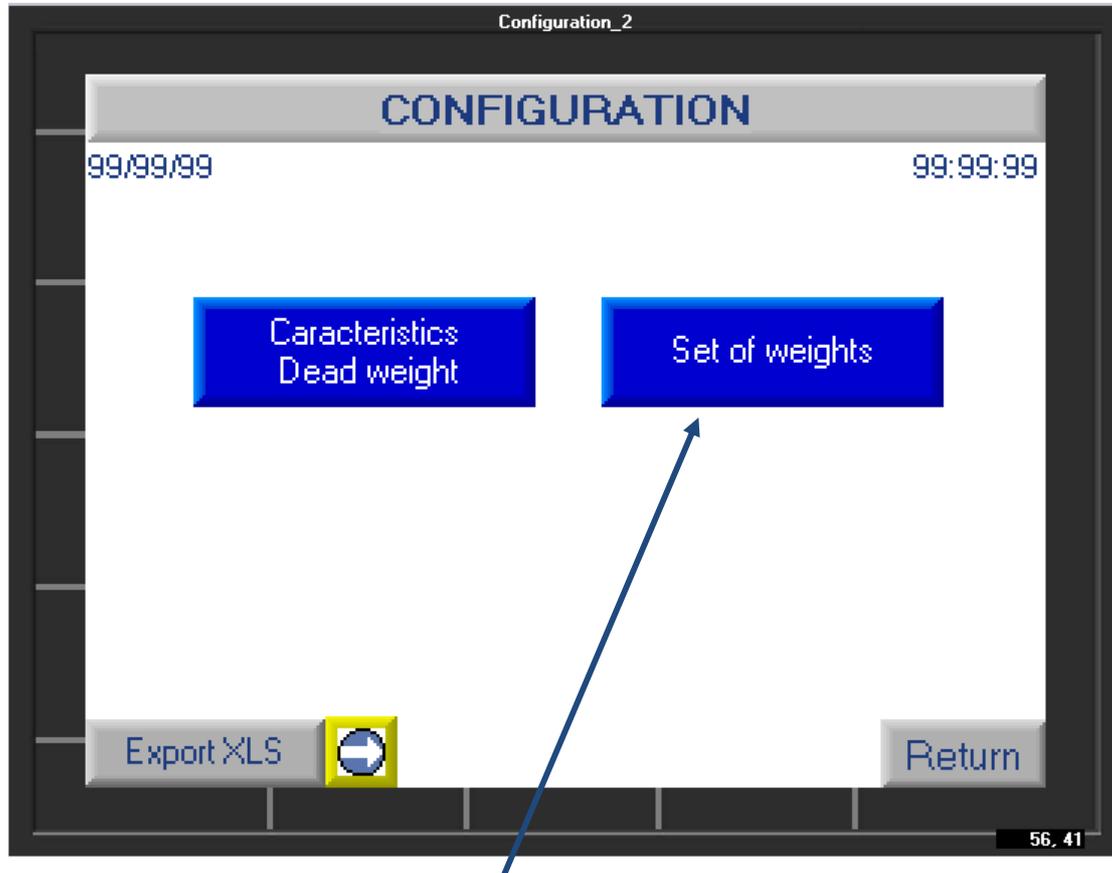
if you click on this button, you will see the following screen:

This screen allows you to view the masses and their value in grams.
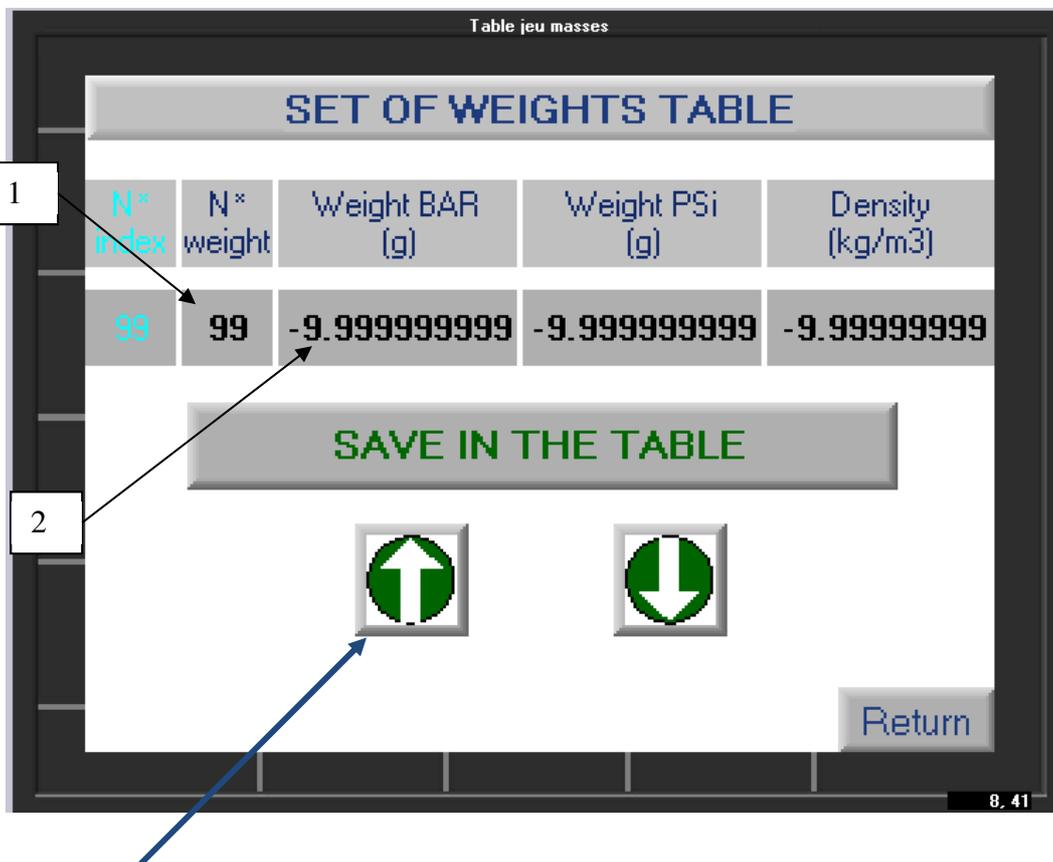
The green arrows allow you to scroll through the weights and their characteristics.

If you wish to enter the new weight value of a mass following a new calibration:
- simply search for it by its serial number (1) by scrolling through the set of weights using the arrows. You will be able to control its characteristics.
- If you need to modify a piece of data: click on the field of the value to modify (2). A keypad screen will open for you to enter the new value.
- Click on "**Save to table**" to save the entry.

Click "**Return**" once you have updated the entire weight set.

b) Calibration of the sensors (2)
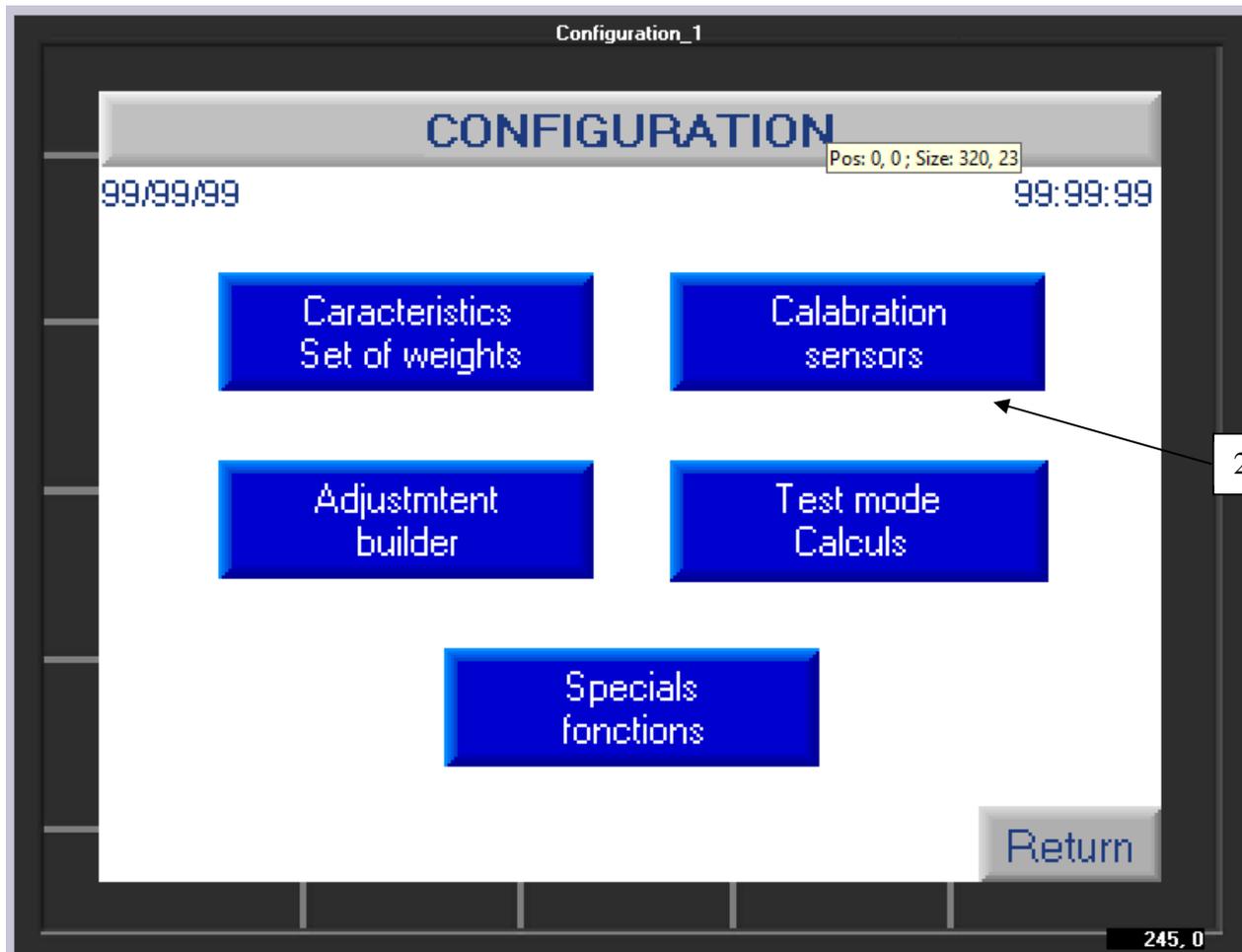
To access the sensor calibration function, click on the button (2) + the access code **1993**.
The following screen appears :
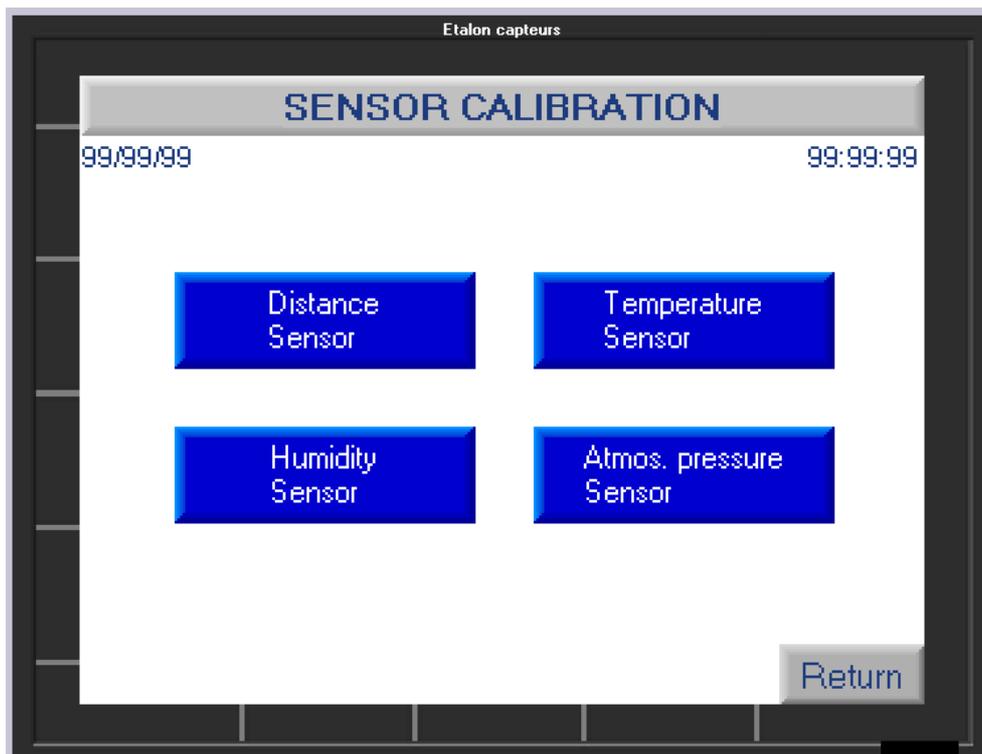
By clicking on the appropriate button, you can access the characteristics of the sensor and enter the necessary correction values. Each field in blue is editable and allows you to enter a correction value. By clicking on it, a numeric keypad will appear for input.

Note: the data entered is not saved permanently. Each time the calculator is started, you must modify these values.

Remember to "**validate**" and press "**return**" to exit.

c)   Manufacturer settings (3)
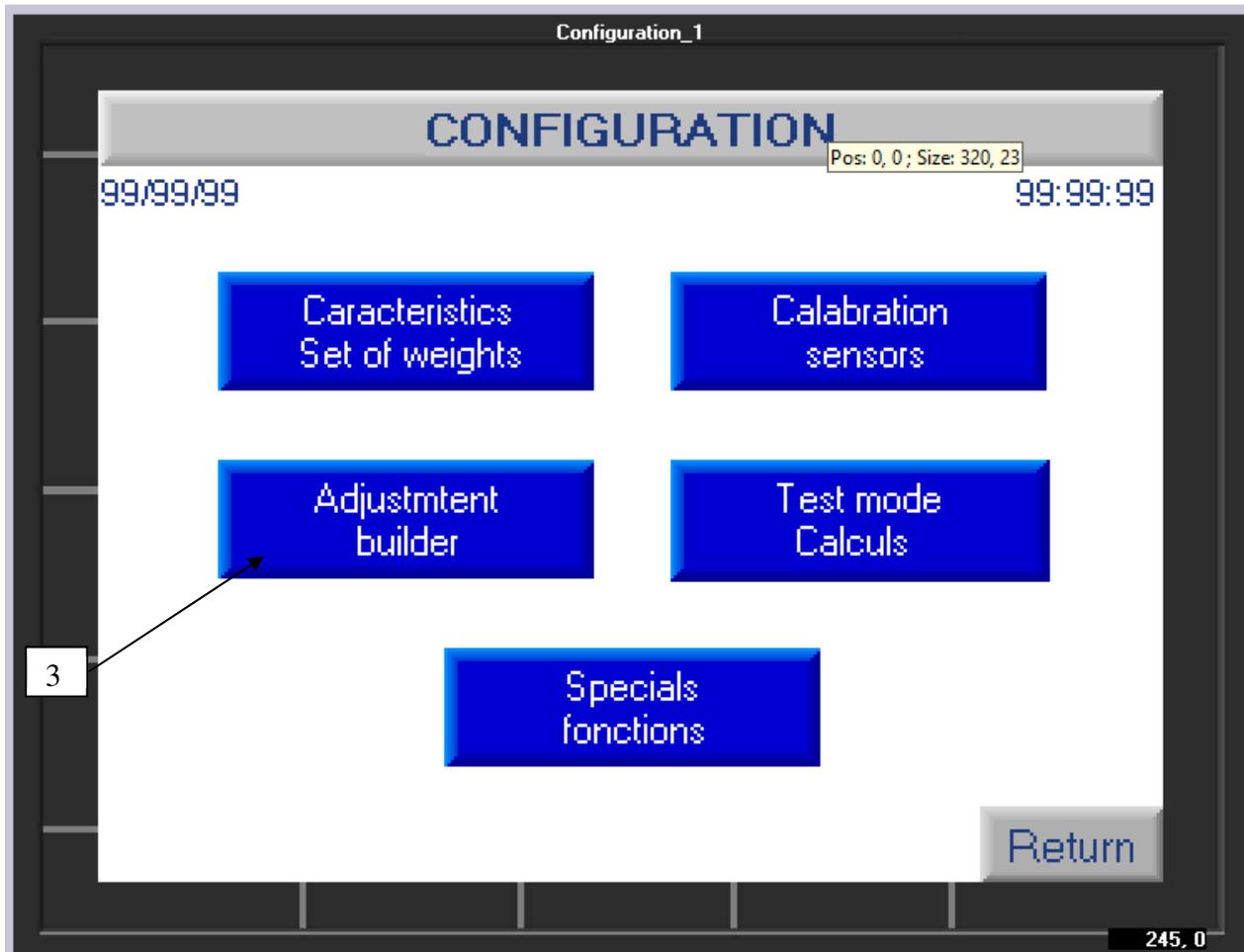
This adjustment function is reserved for AREMECA
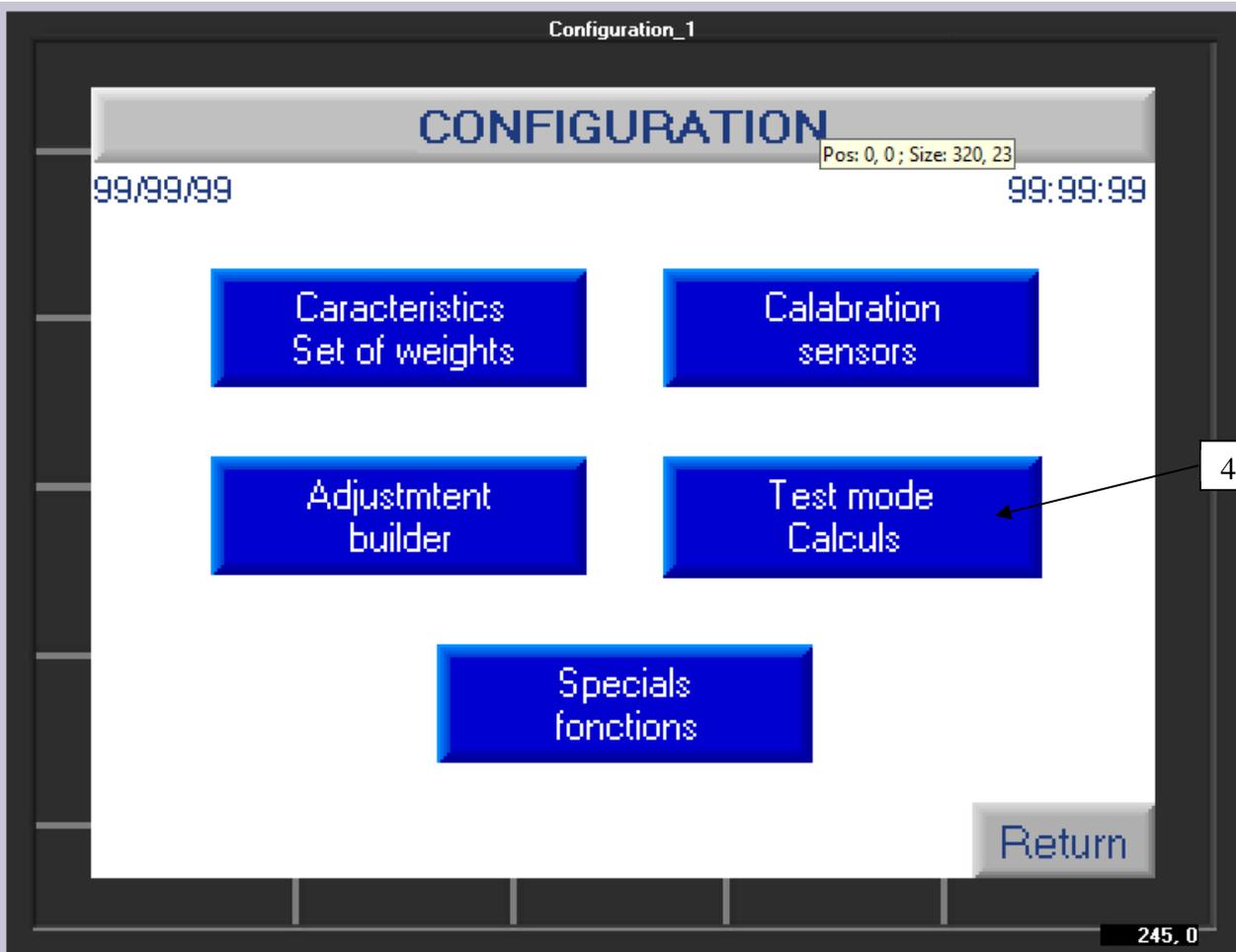
To access the test function, click on the button (4), the following screen appears :
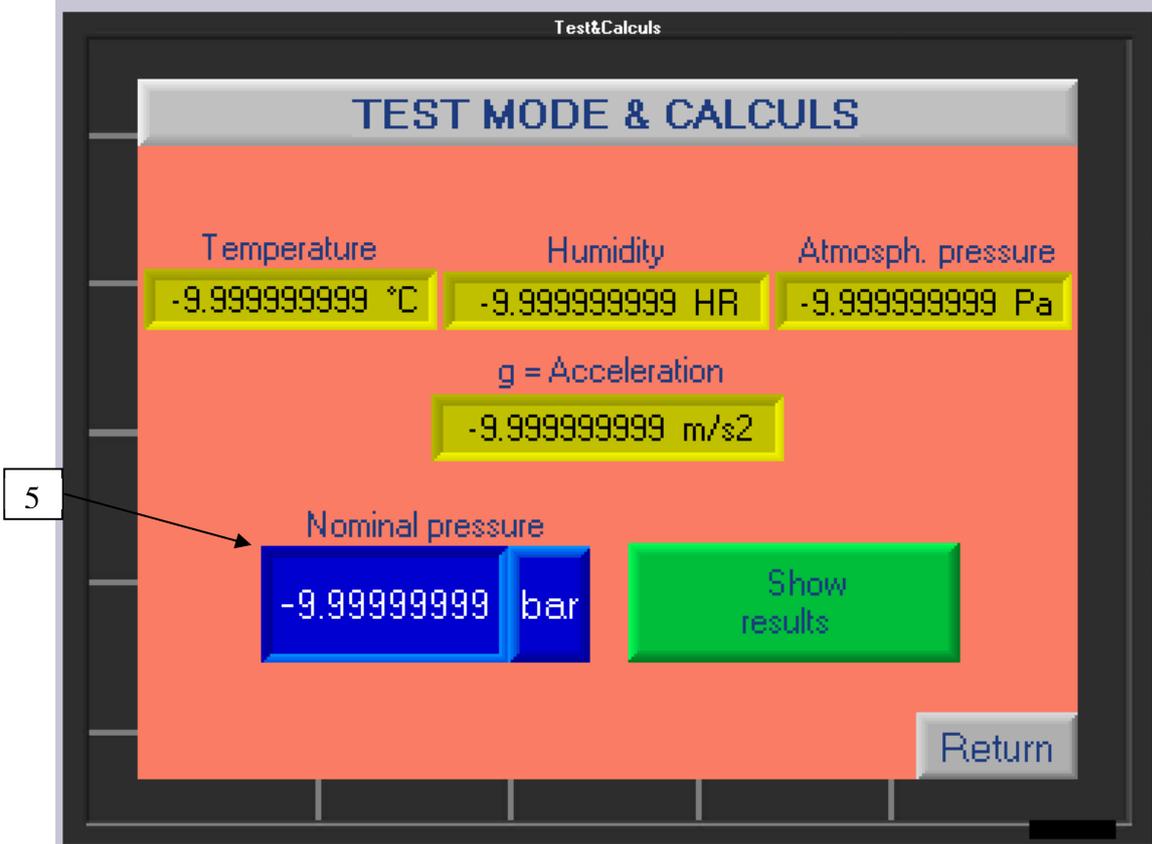
Click on the blue field (5) to enter a pressure value (numeric keypad + validate by pressing the white arrow). Then press the "Show results" button (green button) to go to the next screen.
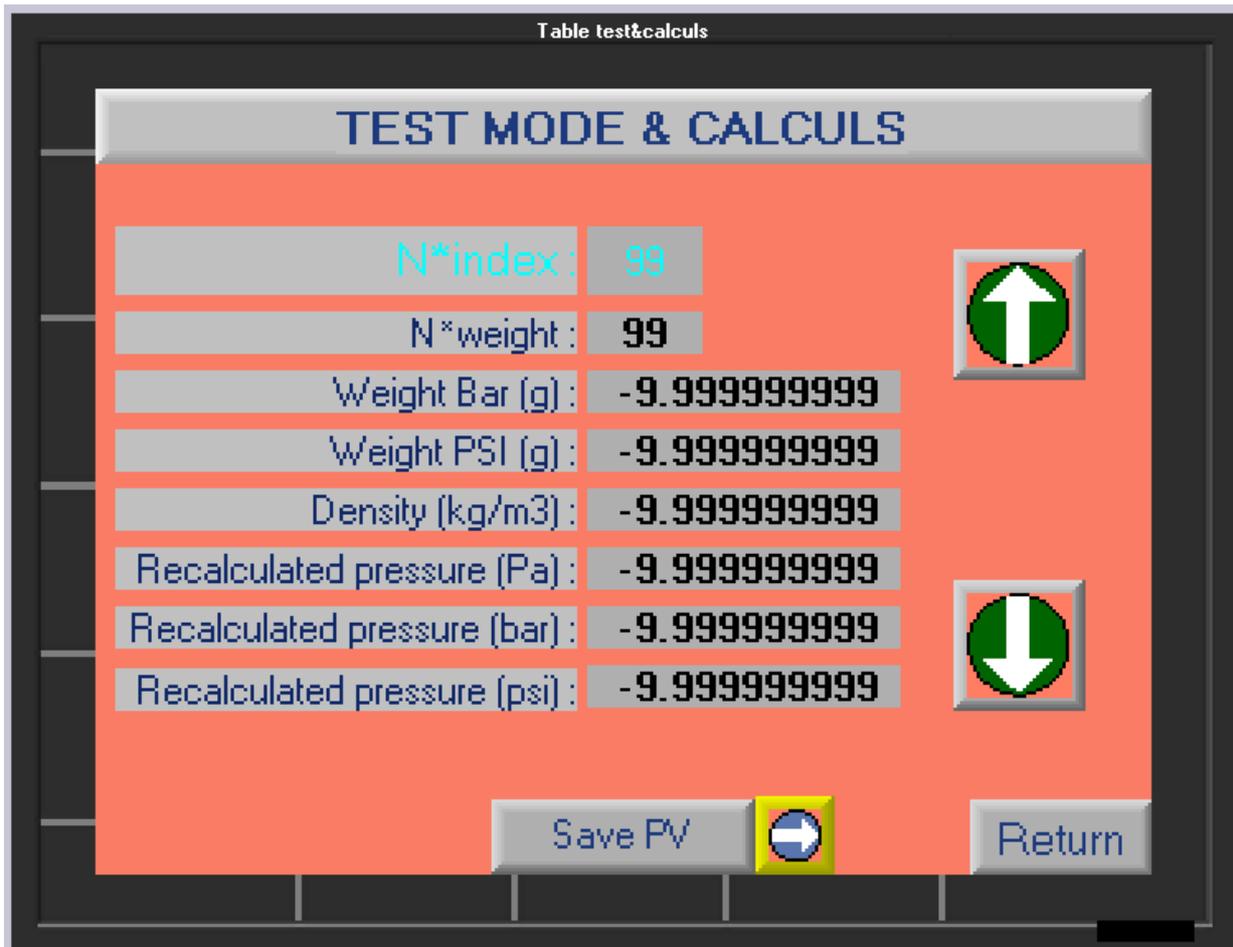
This screen gives you for each weight, the recalculated pressure value in Pa + BAR + PSI, as well as its weight depending on whether the set of weights is in BAR or PSI.

Scroll through the masses using the green arrows.

When finished, click "**Return**"
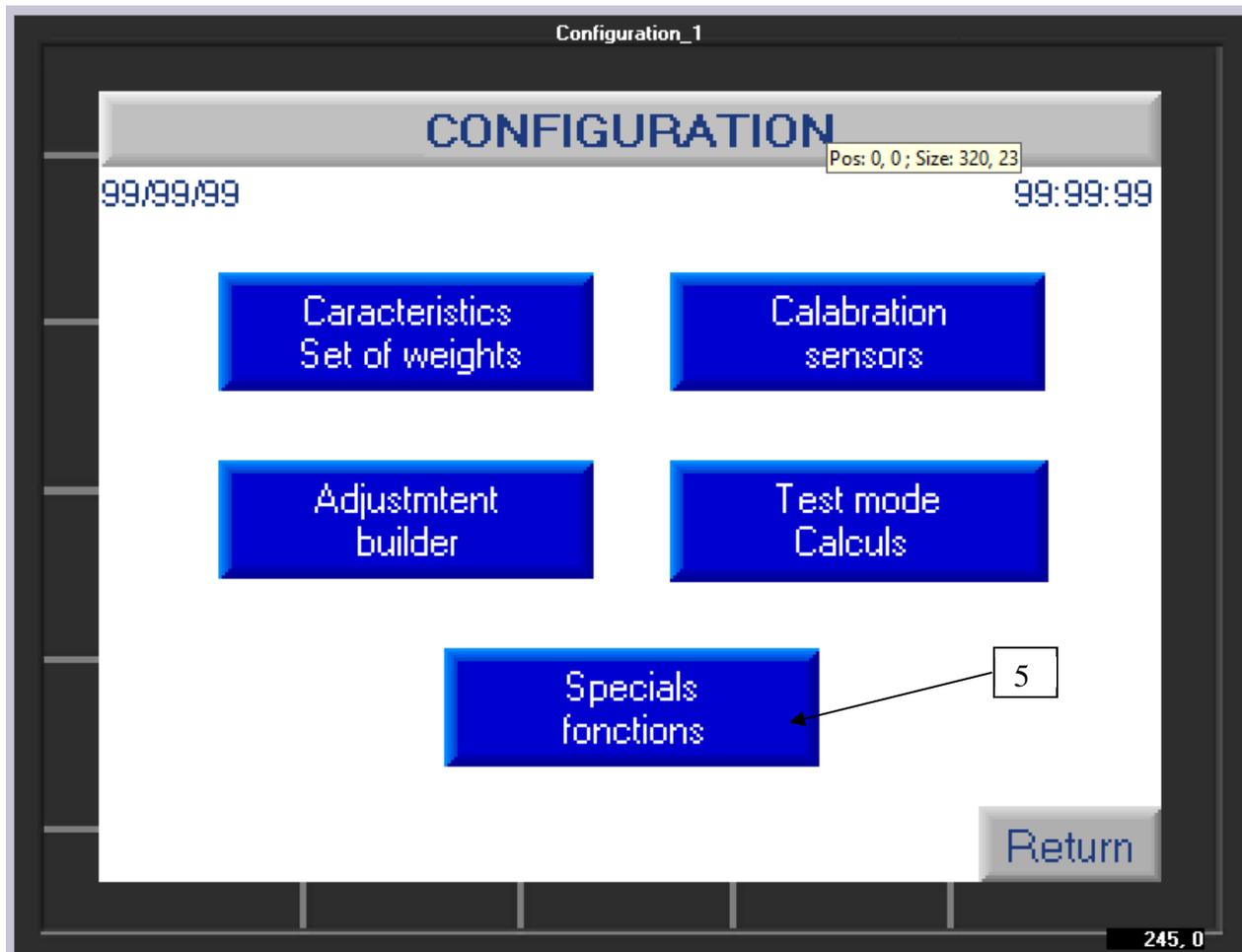
This menu allows you to modify various data such as the date, the time, and the language used by the calculator.

Click on "**Special functions**" (5) + access code **1993** to go to the next screen.

Note: the data entered is not saved permanently. Each time the calculator is started, you must modify its values.

➢ To modify the date or time fields, click on them and enter the correct value using the numeric keypad that appears.
➢ To modify the language field: click on it to scroll to the desired language.

Click "**Return**" to exit.