

ALGS60

Moisture analyzer



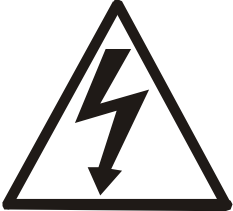
User Manual

ALGS60_ATS118_14.01_EN_U


Indice:

1 Security rules	3
2 Environment protection.....	3
3 Technical data	4
4 General description.....	5
5 Completeness.....	5
6 Navigation-fast start.....	5
7 Operating mode.....	7
8 Keys and indicators	9
9 Preparing moisture analyzer to work	10
10 Interfaces	12
10.1 TPR printer connection	12
11 General working rules.....	13
12 Description of thermogravimetric analysis.....	13
12.1 Infrared radiation source	14
12.2 Infrared radiation drying description	14
12.3 Drawing and preparation of a sample	14
12.4 Tools required	14
12.5 Single-use pans	14
12.6 Placing a sample.....	15
12.7 Glass fibre filter	15
12.8 Practical notes.....	15
13 Moisture analyser functioning description	16
13.1 Switching on.....	16
13.2 Drier operation modes.....	17
13.3 Calculation methods.....	17
13.4 Drier operation parameters setting	18
13.4.1 Drying profile	18
13.5 Moisture analyser settings storing.....	19
13.5.1 Saving settings	19
13.5.2 Loading saved settings.....	20
13.6 Initial moisture analysis	21
13.7 Proper moisture analysis.....	23
14 Connecting to a printer or computer-drying report.....	24
15 Testing and calibration of the balance	27
16 Moisture analyser as a balance.....	28
16.1 Units of measurement	28
16.2 Auto-zeroing.....	29
16.3 Calibration.....	29
17. Maintenance and repairs of small defects	31

1 Security rules

	<p>To avoid electrical shock or damage of the balance or connected peripheral devices, it is necessary to follow the security rules below.</p>
<ul style="list-style-type: none">• To feed the analyser use only mains socket with ground contact• Dryer chamber cover heats up to 60°C, but perforated cover at the top may heat up over 100°C. Do not touch the cover top during drying as it may cause severe burns.• During heating, the halogen heaters warm up to very high temperature. Avoid touching the heaters as it may cause severe burns!• Do not use the analyser when its cover is opened.• Do not use the analyser in explosive conditions.• Do not use the analyser in high humidity.• If the device seems not to operate properly, plug it out of the mains and do not use it until checked by authorised service.• Please return wasted device to the point of purchase or other company specialised in recycling of wasted electronic components.	

2 Environment protection

	<p>According to legal regulations it is forbidden to dispose wasted electronic equipment in waste containers.</p>
<ul style="list-style-type: none">• Please return wasted device to the point of purchase or other company specialised in recycling of wasted electronic components.	

3 Technical data

Maximum sample weight	60g
Minimum sample weight	0,02g
Reading unit (d)	1mg
Tare range	+/-60g
Accuracy class	II
Working temperature	+18 ÷ 33°C
Analyser resolution	0,01%
Moisture measurement accuracy	for sample weight 0,02g ÷ 0,5g ...±1% for sample weight 0,5g ÷ 5g.....±0,1% for sample weight >5g.....<±0,01%
Max drying temperature	160°C
Sampling time	1 ÷ 180s
Maximum drying time	10h
Oven dryer nominal power	2 x 60W(alogeno l=75mm)
Warm-up time (100°C)	3min.
Pan size	φ90mm
Drying chamber dimensions	φ108x20mm
Weight	3,9kg
Device dimensions (with legs)	185x290x170mm
Power	~230V 50Hz 130VA
Connections	-RS232C -PS/2 -USB

4 General description

ALGS60 series moisture analyser is destined for fast and precise moisture determination. The moisture analyser is based on two cooperating devices: the balance, used to measure current sample weight, and the dryer, which dries the sample using halogen heaters. Drying parameters may be set according to user preferences.

Moisture analysers are mainly destined for use in quality control in food industry, building materials industry, biotechnology, pharmacy, environment protection and others.

Moisture analysers may be also used as laboratory balances for routine weighing (without drying).

5 Completeness

Standard package consists of:

1. Moisture analyzer;
2. Pan shield, pan support, pan huddle;
3. Single-use-pans – 10 pcs;
4. Power supply cord;
5. User manual;
6. Guarantee card.

6 Navigation–fast start

After turning on the moisture analyzer, after autotests and tare, moisture analyzer starts initial heating until the drying chamber heats up to 105°C. The moisture analyzer is now ready to measure density with inscribed earlier heating parameters.

To set heating parameters use USER MENU and choose Drying settings.

To move cursor between menu positions use ↑ and ↓ key.

USER MENU

1. Drying settings
2. Memory settings
3. Drying options
4. Drying report
5. Configuration
6. Settings default
7. Exit

Entering chosen menu position is made by using → or ENTER key. Return by ← key.

USER MENU	
1. Drying settings	
2. Memory settings	
3. Drying options	
4. Drying report	
5. Configuration	
6. Settings default	
7. Exit	

Entrance to parameters is made after choosing → or ENTER key.

DRYING SETTINGS	
1. Drying temp. : 160°C	
2. Mode : <short mode>	
3. Calculation : $m_0 - m / m_0 * 100\%$	
4. Samples quantity: 3	
5. Sampling interv. : 10sec	
6. Drying time : 00:15:00s	

Parameter value modification is made by using ↑ and ↓ key, moving to another digit by → key.
Confirmation using ENTER key.

DRYING SETTINGS	
1. Drying temp. : 160°C	
2. Mode : <short mode>	
3. Calculation : $m_0 - m / m_0 * 100\%$	
4. Samples quantity: <3>	
5. Sampling interv. : 10sec	
6. Drying time : 00:15:00s	

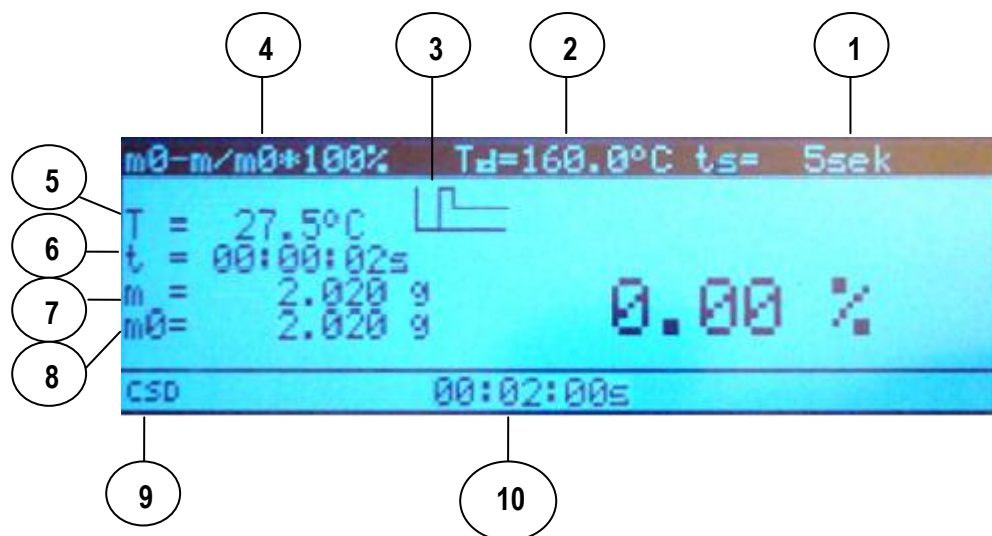
Selection of one of the available parameter options is made by → and ← key. Confirmation using ENTER.

DRYING SETTINGS	
1. Drying temp. : 160°C	
2. Mode : <short mode>	
3. Calculation : $m_0 - m / m_0 * 100\%$	
4. Samples quantity: <3>	
5. Sampling interv. : 10sec	
6. Drying time : 00:15:00s	

7 Operating mode

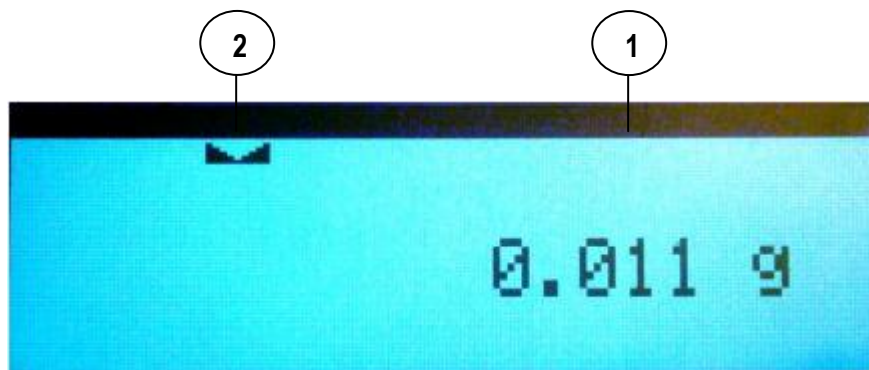
Moisture analyzer can work in one of two modes (changed by ↻ key):

1 Drying (density measurement)



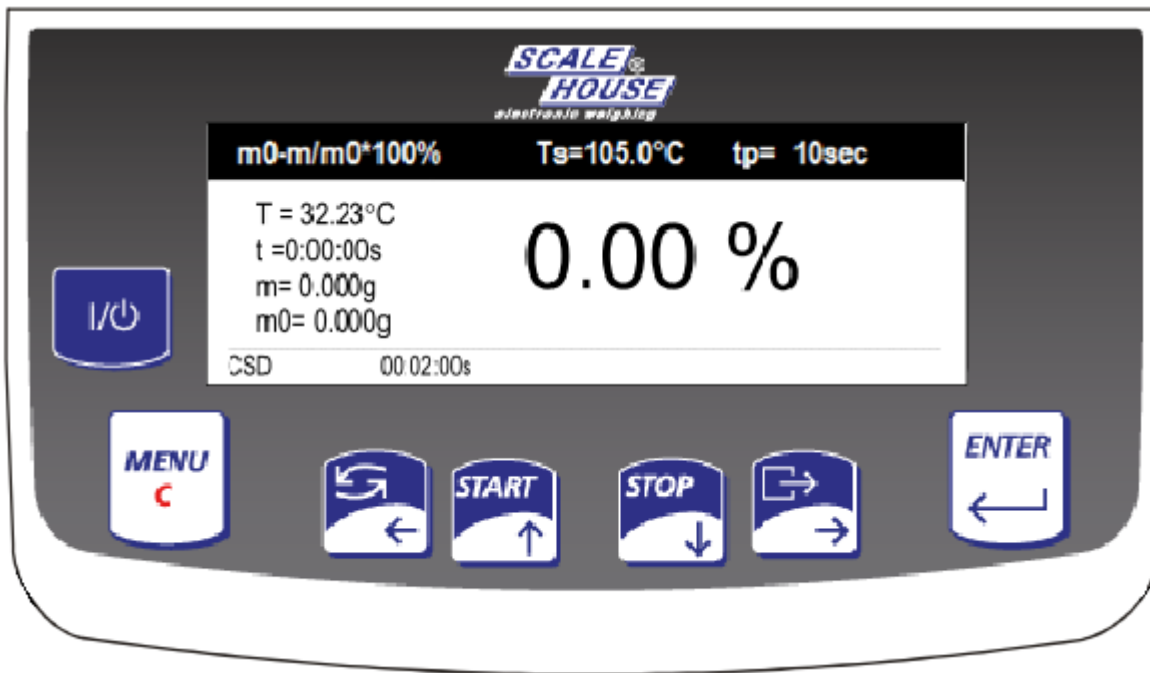
- 1- Simple time
- 2- Inscribed drying temperature
- 3- Drying profile
- 4- Formula evaluation
- 5- Actual temperature
- 6- Actual drying time
- 7- Mass on pan
- 8- Initial mass
- 9- Closed (CSD)/open(OPN)
- 10- Drying maximum time

2 Weighing (mass measurement)



- 1- Mass indication
- 2- Scale stabilization mark

8 Keys and indicators



I/O

-on / off (standby),

ENTER

-confirmation / option choice,

ENTER

-tare (zeroing) scale;

MENU

-enter to menu;

C

-deleting operation;

↺

-switching modes drying/ weighing;

←

-navigation key;

START

-measurement start (drying);

↑

-navigation key;

STOP

-measurement stop;

↓

-navigation key;

→

-printout (transmission) of the result;

→

-navigation key;

Indicator:

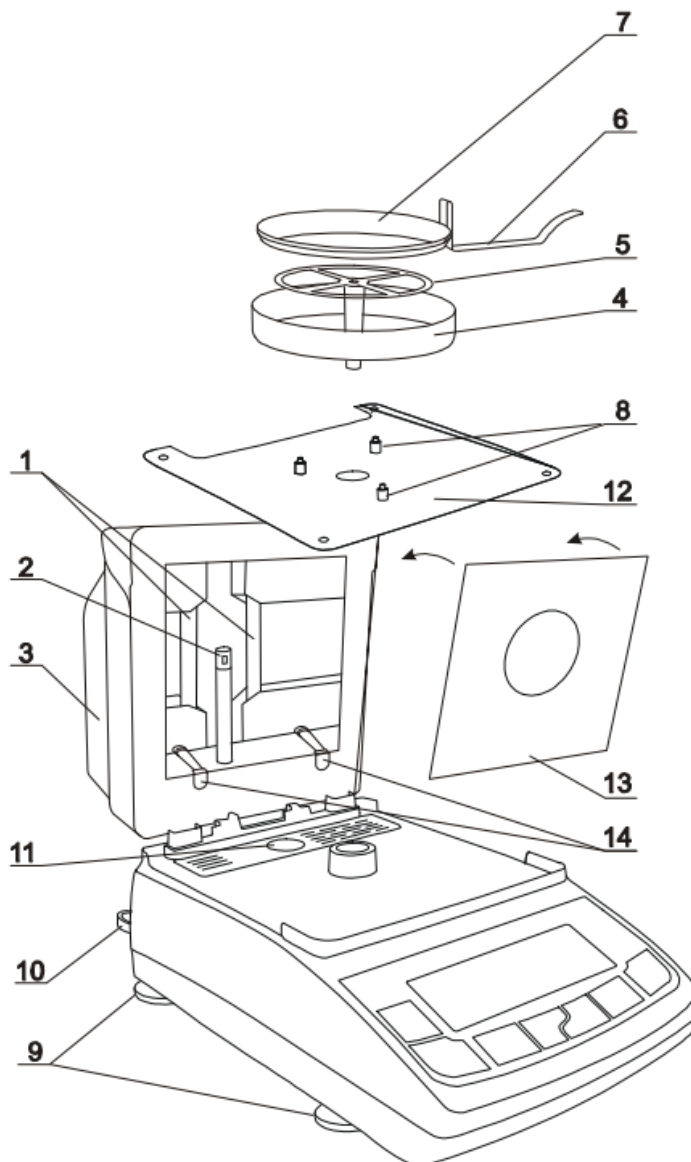
—

-signalling stabilization of measurement result;

OPN/CSD

-signaling closed/open drying chamber

9 Preparing moisture analyzer to work



1. Take all contents out of a package: the moisture analyser and packed separately: the tin pan shield, single use pans, the pan handle and the pan support. It is recommended to keep the original scale package in order to transport the balance safely in future.
2. Place the balance on a stable ground not affected by mechanical vibrations and airflows.
3. Level the balance with rotating legs 9 so that the air bubble in water-level 10 at the back of the balance is in the middle and the moisture analyser rests on all four legs.
4. Open the drying chamber 3 by lifting it by a grip at the front. Insert the window 13 into chamber cover, edges of the window should be located in the latch grooves 14 (push the window until You hear a “click” from all four latches).
5. Put drying chamber floor board 12 on four position pegs in moisture analyzer cover. Put covering plate 4 on three distance pegs 8. Put carefully pan mandrel 5 into scale mechanism hole.

6. Put on empty single-use pan 7 on grip 6 and using the grip place the single pan on scale's carrying pan (grip ring 6 will be located inside the plate but due to longer diameter it will not rest on carrying pan 5).
7. Close the moisture analyzer chamber 3 and connect the scale to 230V supply.
8. This will start moisture analyzer autotests and after stabilization zero indication will show up. Moisture analyzer will start initial heating signalled by a proper communicate on the screen. After initial heating moisture analyzer is ready to work
9. Moisture analyzer shouldn't be used to weigh ferromagnetic materials due to deterioration of measurement precision.



During heating, the halogen heaters 1 warm up to very high temperature. When drying chamber is opened avoid touching the heaters as it may cause severe burns or damage the heaters!

Dryer chamber cover 3 heats up to 60°C, but perforated cover may heat up over 100°C. Do not touch the top cover during drying as it may cause severe burns!



When temperature during initial heating exceeds 105°C or heating time is longer than 3 minute, terminate initial heating with STOP key and check if the temperature sensor 2 works properly and if both halogen heaters light 1 (see chapter 17).

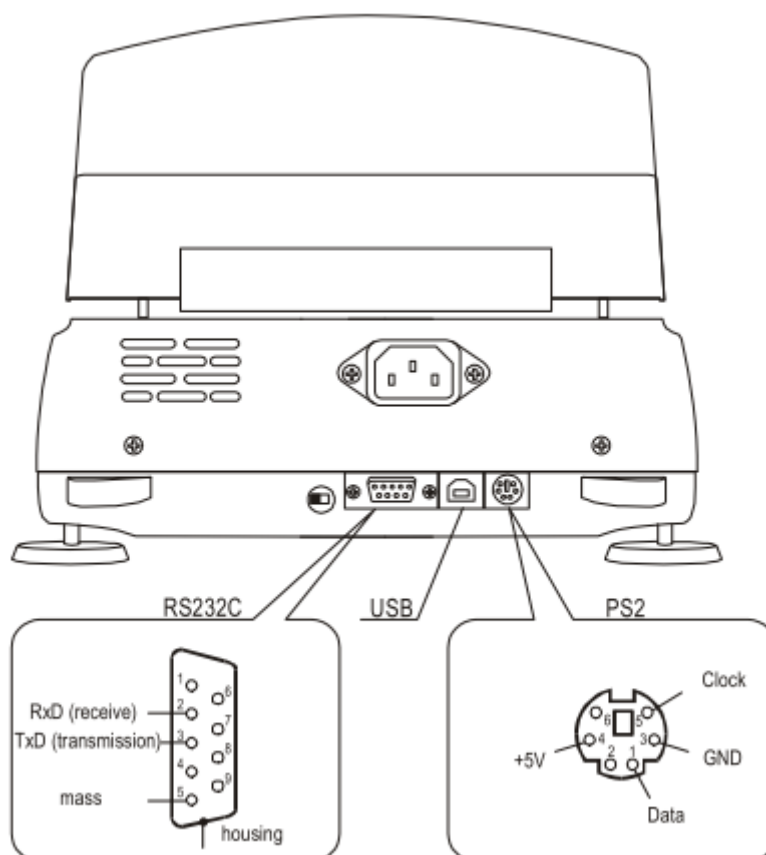
In case any defect occurs contact an authorised service point.



The fuse 11 is available after cover opening and putting out floor board 12. During damaged fuse exchange use a fuse with parameters presented in technical data . Using other fuse may cause electrical shock.

10 Interfaces

The moisture analyser is equipped with RS232C interface to connect a printer, an USB interface to connect the instrument to PC and a PS2 port to connect an external computer keyboard.



10.1 TPR printer connection

TPR	CAVO STANDARD	ALGS60 (connettore 9 Pin)
GND	Black	5-GND
CTS	Yellow	-
RX	Grey	3-TRANSMISSION

TPR printer power supply		
	STANDARD CABLE	POWER SUPPLY
+VP e +VC	Red and Orange	+V (5V / 5A)
GND e GND	Black and Black	- V

NOTES:

- Set baud rate at 1200 and 42 columns print in the TPR (TPR Manual ref.).
- Set baud rate at 1200 in the ALGM (see cap. 14 Connecting to a printer or computer–drying report).

11 General working rules



During transportation remove the pan, the pan support and the pan shield and place it in a separate package...

1. Distribute a sample all over the pan. A sample surface should not touch temperature sensor placed above the pan.
2. The balance is equipped with the tare equal to its range. To tare the balance press →T← key. Writing the tare does not extend measuring range, but only subtracts the tare value from a load placed on the pan. To make weight control easier and to avoid range overdrawing, the balance is equipped with weight indicator (graduated in percentages).
3. Do not overload the balance more than 20% of maximum load (Max).
4. The mechanism of the moisture analyzer is a precise device sensitive to mechanical strokes and shocks. Do not press the pan with a hand.

12 Description of thermogravimetric analysis

This section gives some practical details about moisture analysis using infrared radiation for reliable results and easier use of moisture analyser. The description is based on a pre-production experience and customers' suggestions.

Moisture in substances is an essential quality factor of technical and economical importance.

Methods of determining moisture may be grouped in two main categories: absolute and deductive.

Absolute methods are based on simple relations, e.g. weight decline during drying.

Thermogravimetric analysis used in ALGS60 moisture analyser is an example of this method.

Deductive (indirect) methods measure physical quantity related with moisture, e.g. electromagnetic waves absorption, electrical conductance, acoustic wave speed. Some of these methods, unlike thermogravimetric analysis, enable to determine water content.

Thermogravimetry - lat. thermo – heat, gravi – weight, metry – method

Thermogravimetric analysis – a process of determination of a substance mass decline as a result of heating-up. The sample is weighed before and after heating-up, the difference is calculated in relation to initial weight or final weight (dry mass).

Moisture in substances

Thermogravimetric analysis includes all ingredients evaporating from substances during heating-up, which results in weight decrease.

In result of the above, determining of moisture content in substances is not equal water content. Beside water, moisture consists of all other volatile matter: fats, alcohol, aromas, organic dissolvent and other substances resultant as an effect of thermal decomposition.

Thermogravimetric analysis does not distinguish water from other volatile matters.

Infrared radiation drying is more effective than traditional methods (e.g. in an oven) as the radiation deeply penetrates the substance, which shortens drying time.

12.1 Infrared radiation source

ALGS series moisture analyser uses 2 halogen heaters (rated power 60W, l=75mm) in serial connection as a radiation source. The heaters emit also visible radiation, which does not affect drying process.

12.2 Infrared radiation drying description

Sample drying is a result of absorption of infrared radiation, which results in sample temperature increase and evaporation of volatile matters.

Infrared radiation penetrates surface layers, the depth depends on penetrability of a sample (different in various substances). Part of radiation is reflected by the sample surface. Penetrated layers absorb the radiation and convert its energy into heat. Emitted heat propagates inside the sample. Effectiveness of the propagation depends on thermal conductivity of the sample. The better the conductivity, the faster drying process and volatile matter evaporation. During drying process sample parameters change, its thermal conductivity decreases so there is a risk of burning the sample. Some parameters may be estimated "by sight", e.g. smooth and light surfaces reflect radiation better. This must be taken into account when setting drying parameters.

12.3 Drawing and preparation of a sample

As sample of given substance must be representative, drawing and preparing a sample is very important process as it affects repeatability of measurements. The most common method of homogenizing a sample is mixing. The other method is to draw few samples from different but specific points in a substance and calculate an average value. Another – to draw few samples from different points in a substance, mix them and draw a sample from the mixed samples.

Sampling method depends on the object of a research. For quality purpose many representative samples are analysed. In production control it is enough to assure sampling repeatability, which enables to study a tendency.

While preparing and drawing, it is important that the sample does not absorb moisture from the environment – it is advised that operation time is as short as possible. If it is necessary to analyse more than one sample at the same time, the samples should be closed in plastic bags or other isolated containers. Give attention that samples must not lose moisture inside the container (the container should not consist of too much air, the moisture condensed on the sides of the container should be mixed with the sample again).

12.4 Tools required

Tools and instruments used in preparation process may affect measurement accuracy, so it is advised not to use tools that transmit heat, as it makes the sample lose moisture before analysis.

Use only special mills and pestles..

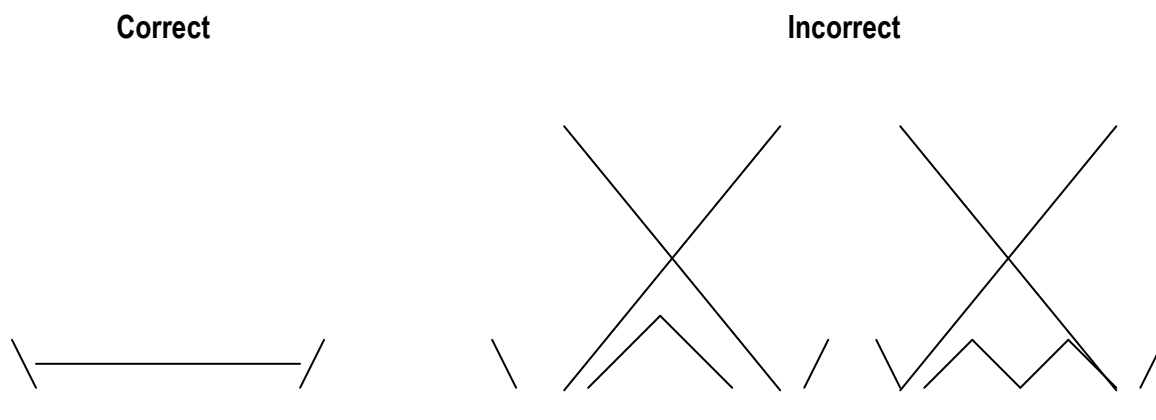
In case of liquids with consisting of solid materials use a glass mixer, a spoon or a magnetic mixer.

12.5 Single-use pans

To analyse the moisture, put a sample on a single-use pan and place it in the dryer chamber. Using non-reusable pan helps to avoid false results by remains of previous samples. 10 single use pans are provided with the moisture analyser. Any quantity may be delivered on demand.

12.6 Placing a sample

A sample should be placed uniformly all over the pan, so that heat propagates equally all over the sample and dries whole sample effectively and quickly without leaving “wet” places.



Attention:

Due to temperature sensor localisation, max sample height is 10mm. When substance ply is too thick, surface layers will be heated too much and internal – not enough. This may result in burning the sample or surface incrustation, which will make drying process difficult and measuring result false. A sample should be placed in uniformed layers 1÷3mm thick, weighing 1÷10g, depending on a substance.

12.7 Glass fibre filter

When drying liquids, pastes or substances that may melt or loose liquid during drying, it is advised to use glass fibre filters.

Filters ensure equal liquid distribution or, in case solid materials, avoiding burning a sample..

12.8 Practical notes

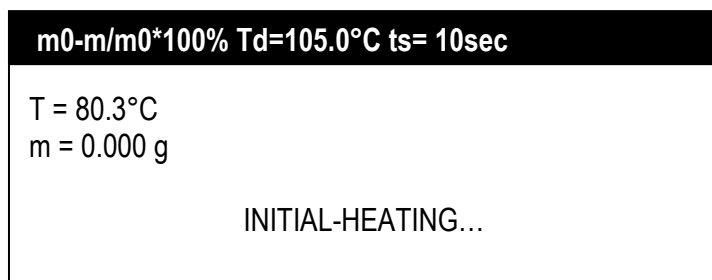
Put a sample on the pan as quickly as possible to avoid losing moisture. Temperature inside the chamber is much higher than outside, so the sample may evaporate partly before measurement begins, which will result in a false result. When analysing the same substance quantity in successive measurements, use the same tools to put a sample to be sure that samples are each time of the same size. Before putting a sample, tare a single-use pan and take it out of the chamber. Right after putting a sample on the pan, place it inside the analyser chamber, close the chamber and press START. Be sure that no dirt sticks under the pan, as it may increase sample weight and result in false values.

13 Moisture analyser functioning description

13.1 Switching on

After switching-on the moisture analyser proceeds with self-tests and displays company logo.

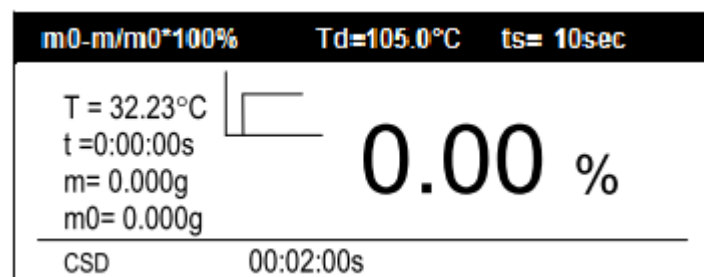
Next the moisture analyzer is taring. After taring initial heating starts in order to create proper conditions inside drying chamber.



Initial heating should warm the drying chamber up to 105°C within 3 minute.

When temperature during initial heating exceeds 105°C or heating time is longer than 3 minute, terminate initial heating with STOP key and check if the analyser is not damaged (see chapter 17).

After initial heating is completed (or terminated), the device displays the following information:



Legend:

m0-m/m0*100% - formula used to calculate the moisture

Td – defined drying temperature

td – defined sample drying time

T – current temperature in the drying chamber

m – current weight

t – current drying time

m0 – initial weight



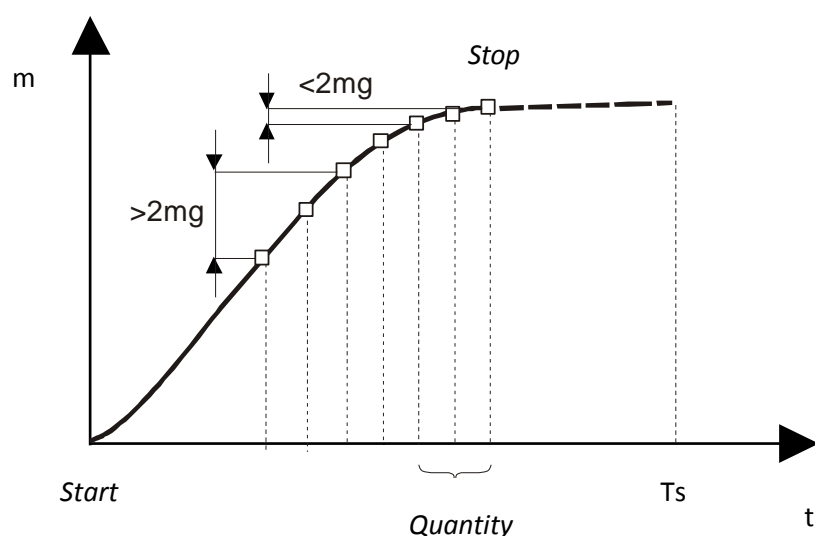
- graphical marking of drying profile

(centrally in lower line) – inscribed drying time

13.2 Drier operation modes

During the balance – drier operation sampling of the mass on the pan takes place. Sampling time is set by the user, according to drying process speed. As a result of sampling the current humidity value is calculated and displayed. Measurement is finished depending on selected drying mode (step **MENU**→**Drying settings**→**Mode**):

1. In “**time mode**” total humidity measurement time (**Drying time**) is defined by the user.
2. In “**short mode**” humidity measurement is finished, when drying is stopped and differences of a few successive mass samples are smaller than threshold value (2 mg). Amount of successive samples taken into consideration is defined as **Samples quantity**. Measurement is finished when **Drying time** is exceeded at the latest.



Drying chart in Short mode for Samples quantity = 3.

13.3 Calculation methods

Humidity may be calculated upon the basis of various mathematic formulas, defined in balance – drier as Calculation method:

1. Relative humidity, defined in relation to initial mass
 $w [\%] = \frac{m_0 - m}{m_0} \cdot 100\%$,
where m_0 – initial mass, m – current mass
2. Relative humidity, defined in relation to current mass
 $w [\%] = \frac{m_0 - m}{m} \cdot 100\%$,
3. Percent current mass content in sample
 $w [\%] = \frac{m}{m_0} \cdot 100\%$.

Drying temperature is maximum temperature, measured by sensor, located in the dried material vicinity. Note that the dried material temperature may be higher than its surrounding temperature.

13.4 Drier operation parameters setting

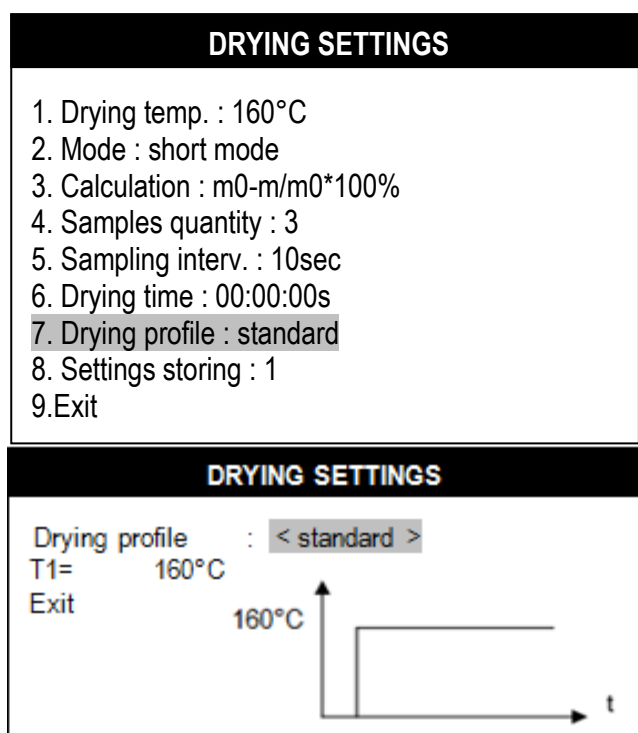
To obtain proper results of the measurement of the density the parameters must be set as follows:

- Drying temperature (max 160°C all'interno della camera di essiccazione);
- Mode "**Drying time**" (terminated after the set time) or mode "**Short mode**";
- Calculation – formula for calculate the humidity;
- Samples quantity (2, 3, 4 or 5) – amount deciding of drying end (in case of "**Short mode**" only)
- Sampling interval - interval between successive mass measurements (1÷180sec.);
- Drying time (1s ÷ 10h, in case of "**Short mode**" it is the maximum time for drying);
- Settings storing – number of memory location (1÷10), where the settings will be stored.

To store the settings select Exit and press **ENTER**.

13.4.1 Drying profile

Drying profile will be used to optimization of drying process to physical properties of sample material.



Step or slow profile can be used to oxidizing or surfaces thicken materials

Quick profile can be used to immune materials

13.5 Moisture analyser settings storing

The moisture analyser enables to save 20 different drying settings. Saved settings are kept in the memory even after unplugging balance from the mains.

13.5.1 Saving settings

To save drying settings follow the instructions below:

- Enter to step **Menu→Drying settings**
- Set necessary drying settings;
- Select Settings storing option using ▲ and ▼ and press ENTER to accept.
- Choose a reference number for specific setting using ◀ and ▶ keys and press ENTER to accept.
- Then chose **Exit** and press **ENTER**.
- To save settings choose **YES** and press **ENTER** to accept.

DRYING SETTINGS
1. Drying temp. : 160°C
2. Mode : short mode
3. Calculation : $m_0 - m / m_0 * 100\%$
4. Samples quantity : 3
5. Sampling interv. : 10sec
6. Drying time : 00:00:00s
7. Drying profile : standard
8. Settings storing : <1>
9.Exit

DRYING SETTINGS
1. Drying temp. : 160°C
2. Mode : short mode
3. Calculation : $m_0 - m / m_0 * 100\%$
4. Samples quantity : 3
5. Sampling interv. : 10sec
6. Drying time : 00:00:00s
7. Drying profile : standard
8. Settings storing : 1
9.Exit

DRYING SETTINGS
Save settings ?
NO
YES

13.5.2 Loading saved settings

In order to call earlier settings saved in memory, you enter the menu and choose option **Memory settings** and choose memory cell number where settings were earlier made.

USER MENU

1. Drying settings
2. Memory settings
3. Drying options
4. Drying report
5. Configuration
6. Settings default
7. Exit

MEMORY SETTINGS

Memory locat.: <1>
Settings :

13.6 Initial moisture analysis

To determine optimal drying parameters for unknown sample, it is recommended to perform initial measurement with activated drying chart displaying. To do this, set the following drying parameters (see cap.13.4 Drier operation parameters setting)

- **Drying temp.** :
 - organic substances: 80 – 120°C
 - inorganic substances: 140 – 160°C
- **Mode** : time mode
- **Calculation** : $m_0 - m / m_0 * 100\%$
- **Samples quantity**: no setted
- **Sampling interv.** : 1 sec
- **Drying time** : set time, after which the sample will be definitely dried

To activate displaying of drying chart, which will be visible on the display instead of humidity indication, perform the following actions:

USER MENU

1. Drying settings
2. Memory settings
3. Drying options
4. Drying report
5. Configuration
6. Settings default
7. Exit

DRYING OPTIONS

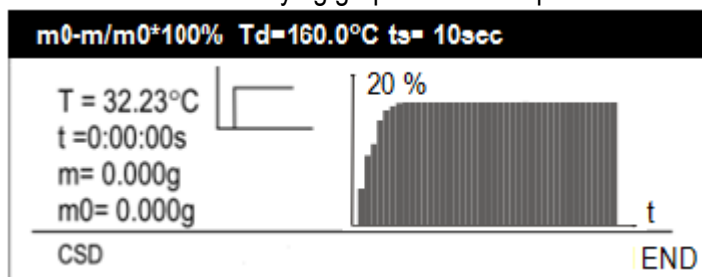
1. Average
2. Drying chart
3. Transmission
4. Correction temp.
5. Exit

DRYING CHART

1. Status : ON
2. Exit

Tare the moisture analyzer with empty single-use pan ($\rightarrow T \leftarrow$ key). Put a sample of examined material on single-use pan, put it into drying chamber and press START key.

After measurement a drying graph will show up:



Observing drying process chart it is possible to evaluate its course and define time required for complete drying. The chart shows 160 time samples on the X axis (for longer times chart is scaled to 360 samples, 720, etc.) and humidity value according to selected formula on the Y axis (chart is automatically scaled to 10%, 30%, 50%, etc.). Selecting 1 s of sampling time allows for more precise chart. Achieved chart allows for initial settings selection for main measurement. Drying temperature should be selected according to dries material type, so the drying is performed quickly and sample does not change color. Material drying moment is visible on the chart as drying characteristic bending. As Drying time for main humidity measurement select time from the beginning to chart "flattening". As the time axis is not described on the chart, use "evaluation with high margin". Too short drying time does not allow to achieve precise humidity measurement results. In case of Short mode, in main measurement select Sampling time, which allows to include approx. 10 samples in time of characteristic bending. If drying is finished too quickly, increase Samples quantity or sampling time.

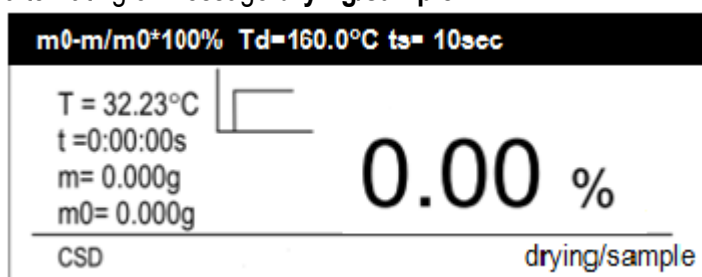
Notes:

Before main measurement remember about deactivating of chart displaying.

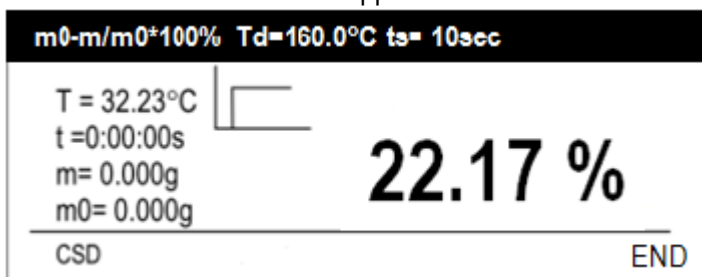
13.7 Proper moisture analysis

Before measurement carefully prepare the sample (see cap. 12 **Description of thermogravimetric analysis**) and set correct drying parameters (see cap.13.4 **Drier operation parameters setting**).

Place an empty single-use pan and tare the balance with →T← key. The indication should be m=0,000g. Open the drying chamber and using the pan handle place the single-use pan with the sample on the pan support. Close the chamber. Start the measurement choosing START key. In the lower line the time left to end the measurement and successive measurement number is displayed. Drying in progress is signalled with alternating of message **drying/sample**.




Wait until END communicate appears. Now read the result.



Attention: No **STB** communicate and m0 sign in negative, marks acceptance of unstable initial mass value m0, caused by pressing the pan to chamber wall or by too fast sample drying, which can cause to measurement failures.

14 Connecting to a printer or computer–drying report

When drying process is finished measurement result can be send, using key , to printer (RS232C interface) or and a computer (USB interface). Measuring data can be also completed with text information. To enter text descriptions user can use moisture analyzer keys or connect a computer keyboard to PS2 port at the back of the device. Using computer keyboard enables to control all scale functions.

To enter additional information you must go to step **USER MENU→Drying report**, where you can insert “Product name”, “Operator”, “Remarks” and set the print data.

DRYING REPORT
1. Product name :
2. Operator :
3. Remarks
4. Print settings
5. Exit

To set the print data you must go to step **Print settings** where you can select and deselect the data to print.

DRYING REPORT
1. Product name :
2. Operator :
3. Remarks
4. Print settings
5. Exit

PRINTOUT
<input type="checkbox"/> Date
<input type="checkbox"/> Time
<input type="checkbox"/> Nr
<input type="checkbox"/> Name
<input type="checkbox"/> Drying temp.
<input type="checkbox"/> Profile
<input type="checkbox"/> Mode
<input type="checkbox"/> Method
<input type="checkbox"/> Finished
<input type="checkbox"/> Initial weight
<input type="checkbox"/> Final weight
<input type="checkbox"/> Drying time
<input type="checkbox"/> Sampling int.
<input type="checkbox"/> Moisture
<input type="checkbox"/> Quantity
<input type="checkbox"/> Average
<input type="checkbox"/> Remarks
<input type="checkbox"/> Performance
<input type="checkbox"/> Signature
Exit

Using moisture analyzer keyboard user can inscribe signs: 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9 (only digits).
A set of characters available using computer keyboard (PS2) while you use Product name, Operator or Remarks:

1 . , ' ? ! " - () @ / : _ ; + & % * = < > \$ [] { } \ ~ ^ ' # |
2 A B C a b c
3 D E F d e f
4 G H I g h i
5 J K L j k l
6 M N O m n o
7 P Q R S p q r s
8 T U V t u v
9 W X Y Z w x y z
0 space

To print the drying report press key .

Drying started	
Date	:2013-03-15
Time	:13:52:48
Model	:ALG560
Serial number	: 120
Drying parameters	
Product	:
Drying temperature	: 160.0 °C
Drying profile	: standard
Mode	: Short mode
Calculation	: $m_0 - m / m_0 \times 100\%$
Finished	: time over
Initial weight	: 0.000 g
Final weight	: 0.000 g
Drying time	: 0 sec
Sampling interval	: 10 sec
Moisture	: 0.00 %
NOTE	
The analysis performed by:	
Signature.....	

To set the serial ports parameter you must go to step
USER MENU→Configuration→Interface→Port1/Port2

USER MENU

- 1.Drying settings
- 2.Memory settings
- 3.Drying options
- 4.Drying report
- 5.Configuration
- 6.Settings default
- 7.Exit

CONFIGURATION

- 1.Units
- 2.Auto-zeroing
- 3.Interface
- 4.LCD settings
- 5.Language
- 6.Time&date

INTERFACE

1. Port 1
2. Port 2
3. Exit

PORT 1

1. Baudrate: 1200
2. Bits : 8-bit
3. Parity : none
4. Sending : NORMAL
6. Protocol : LONG
7. Exit

15 Testing and calibration of the balance

To check the weighing function of balance – drier, switch it to the simple weighing (\leftrightarrow key) and check it by putting precisely weighed object, e.g. calibration weight F2 (OIML), equal to device measurement range. In case of any inaccuracies perform the balance calibration. It is performed by activating the calibration function, available in special functions menu, and putting the calibration weight on the pan according to indications on the display (see cap. **16.3 Calibration**).

Control of humidity measurement precision requires use of standard substance – disodium tartrate (di-Sodium tartrate dihydrate $C_4H_4Na_2O_6 \cdot H_2O$). For the control use 5g sample, setting: step mode, calculations method: $m/m_0 \cdot 100\%$, temperature $150^\circ C$, sampling time 10s, samples amount 4 and drying time 00:15:00s.

The result should be contained in range 15.61–15.71%.

16 Moisture analyser as a balance

The moisture analyser may be also used as a normal balance. To switch between analyser / weighing mode press ↺ key.

During moisture analyzer work as a normal balance essential influence on measurement result has the proper setting of moisture analyzer level (level indicator is at the back of the device) and precise balance calibration. Setting balance level is important after each putting moisture analyzer into new place.

During normal weighing Menu key opens directly Configuration window.

CONFIGURATION

1. Units
2. Auto-zeroing
3. Interface
4. LCD settings
5. Language
6. Time/date
7. Keyboard
8. Defaults
9. Calibration
10. Info
11. Firmware update
12. Exit

16.1 Units of measurement

In order to change the unit used go to step **USER MENU→Configuration→Units**, or use MENU key when the moisture analyzer works as a normal balance.

UNITS

- ☐ Carats [ct]
- ☐ Miligram [mg]
- ☐ Gram [g]
- ☐ Kilogram [kg]
- ☐ Pound [lb]
- ☐ Ounce [oz]
- ☐ Punce troy [ozt]
- ☐ Grain [gr]
- ☐ Pennyweight [dwt]
- ☐ Newton [N]
- Exit

16.2 Auto-zeroing

Auto-zeroing function causes that the close to zero indication will be corrected automatically and when the pan is unbiased zero indication will be hold independently even when environment conditions change (temperature, air density etc).

To enable/disable the the auto-zeroing you must go to step **USER MENU→Configuration→Auto-zeroing** and enable/disable the parameter **Status**.

AUTO-ZEROING
1. Status: ON
2. EXIT

16.3 Calibration

Calibration with external weight standard should be performed in case indications exceed permissible error (for example more than 5 graduation overflow). To scale calibration use weight standard presented in technical data table (or more precise). Depending on the value of gravity acceleration the producer sets the scale to specific location of use.

If the location of use change the scale should be calibrated once again

Attention: Scale sensitivity error doesn't cause directly humidity error thanks to percentage calculation formula.

In order to calibrate the balance go to step **USER MENU→Configuration→Calibration**.

Load enables to inscribe standard mass value that will be used to calibrate. User can choose from few values or inscribe his own value.

CALIBRATION
1. Calibration
2. Load : 50g
3. Exit

After setting the standard of mass prepare single-use pan, put the standard and choose **Calibration** option by pressing ENTER. Then the instrument will display.

CALIBRATION
1. Calibration
2. Load : 50g
3. Exit

CALIBRATION
Please wait...

CALIBRATION
TARING

Put the standard of mass on the pan.

CALIBRATION
Put the load
CALIBRATION
Please wait...

If the calibration is done successfully the instrument returns on initial display.

17. Maintenance and repairs of small defects

1. A moisture analyser should be kept clean.
2. Take care that no dirt gets between the casing and the pan. If found any, remove the pan (lift it up), remove dirt and then replace the pan.
3. In case of improper operation caused by a short-lasting power supply decay, unplug the balance from the mains and then plug it again after few seconds.
4. It is forbidden to make any repairs by unauthorised persons.
5. To repair the scale, please contact an authorised service centre. Balances can be sent for repair as messenger delivery only in original package, if not, there is a risk of damaging the balance and losing warranty.

Measuring problems

Problem	Solution
A sample burns down	<ul style="list-style-type: none">- Reduce temperature- Use glass fibre filter on the top of the sample- Reduce sample quantity and distribute it uniformly
Drying lasts too long	<ul style="list-style-type: none">- Increase temperature- Reduce sample mass
A sample loses weight before measurement	<ul style="list-style-type: none">- Take out the pan and put a sample outside the chamber
A sample is liquid or paste	<ul style="list-style-type: none">- Use glass fibre filter
A sample does not consist of enough volatile matters	<ul style="list-style-type: none">- Enlarge a sample

Troubleshooting

Display indication	Possible causes	Remedy
Initial heating Td temperature exceeds 105°C, the sensor does not react when touched with a finger	The temperature sensor is damaged.	Contact an authorised service point.
Initial heating Td temperature does not reach 105°C during 3 minutes time, the halogen heater(s) do not light.	The heater is damaged.	Replace the heater.
"Test ..."	Auto-tests in progress / electronic unit damage	wait for 1 minute
" _ _ _ _ "	The balance is during zeroing / mechanical damage	wait for 1 minute check if the balance is placed on stable ground, not affected by vibrations
"Err-b"	Permissible zeroing range was exceeded at the power on	Remove the load from the pan
"Capacity exceeded"	Permissible weighing range (Max +9e) was exceeded	Reduce the load
"Capacity exceeded"	Upper limit of analog-digital transducer measuring range was exceeded	Remove the load from the pan
"Too low"	Lower limit of analog-digital transducer measuring range	Check if there are all necessary pan elements

DECLARATION OF CONFORMITY

This device conforms to the essential standards and norms relative to the applicable European regulations. The Declaration of conformity is available in the web site www.scalehouse.it.

WARRANTY

Scale House products are guaranteed for a period of twelve months from delivery, excluding the parts classified as expendable materials such as mechanical printing heads, batteries, electric motors and wheels. The warranty for these expendable materials is three months. The warranty refers to breakdowns resulting from any construction defect or material defect of the product supplied and covers the cost of labor and spare parts. The product must be returned to the Seller address in its original packaging with shipping paid by the sender. The warranty does not apply to breakdowns due to improper use or non-observance of the operating instructions, electrical phenomenon, unauthorized repair attempt, connection to other equipment or removal of any product identification elements (serial number, label, etc.). This warranty does not provide for any compensation for damages, direct or indirect, incurred by the user due to complete or partial failure of instruments, even during the warranty period. The warranty for the load cells excludes the damages caused by knocks and overloads.

AUTHORISED SERVICE CENTRE STAMP

