



AG(Z)100C-AG(Z)500C



AG(Z)600C



AG(Z)1000C-AG(Z)4000C, AGZ10C

# **USER MANUAL**

AG/C and AGZ/C SERIES

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## 1. General description

AG/C and AGZ/C series electronic balances are destined for high accuracy weighing in laboratory practice.

AG/C series balances are equipped with internal calibration system for accuracy control during balance operation.

All balances are metrologically tested. According to an order balances can be calibrated or legally verified.

Balances with legal verification are marked with the following legal and securing items:

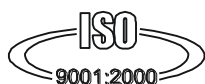
- green metrological mark placed on the balance name plate,
- notified body stamp (number of notified body) on the balance name plate,
- protective seals placed on: an edge of balance name plate, the casing mounting screw and in the place of access to adjustment switch,

Renewing of balance legal verification is required when protective seal is violated or after period of 3 years starting from 1<sup>st</sup> December of year when first legal verification was performed. In order to renew legal verification please contact authorized service of AXIS.

When legal verification is not required AGZ/C series balances can be used, which do not have internal calibration system. In AGZ/C series balances all functions connected with internal calibration are removed (chapter 11 and 14.5).

Balance classification according to PKWiU: 33.20.31.

Certificates:



Certificate of ISO quality system  
DIN EN ISO 9001:2000



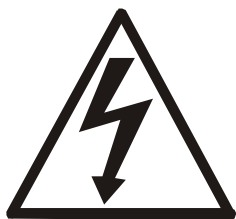
Certificate of balance type approval  
TCM 128/06-4428

## 2. Completeness

A standard set consist of:

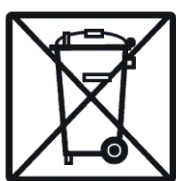
1. Balance
2. Pan elements:
  - for balances with round pan (AG100C-AG600C): a pan support and a pan,
  - for balances with rectangular pan (AG1000C-AG4000C, AGZ10C): gum nuts (4pcs) and a pan,
3. Draft shield with cover (AG100C-AG500C),
4. Feeder 12V / 850mA
5. User manual,
6. Guarantee card

### 3. **Safety rules**



It is necessary to follow safety rules of work with the balance shown below. Obeying those rules is the condition to avoid electrical shock or damage of the balance or connected peripheral devices.

- Repairs and necessary regulations can be done by authorised personnel only.
- To avoid fire risk use a feeder of an appropriate type (supplied with the balance) and supply voltage have to be compatible with specified technical data.
- Do not use the balance when its cover is opened.
- Do not use the balance in explosive conditions.
- Do not use the balance in high humidity environment.
- If the balance seems not to operate properly, switch it off and do not use until checked by authorised service.



According to current acts of law about protection of natural environment, wasted balances should not be put into waste containers together with ordinary waste.

- Wasted balance after operation period can be delivered to units authorized for gathering wasted electronic devices or to the place where it was bought.

#### 4. Technical data

Type	AG100C AGZ100C	AG200C AGZ200C	AG300C AGZ300C	AG500C AGZ500C
Capacity (Max)	100g	200g	300g	500g
Min load (Min)	0,02g	0,02g	0,02g	0,02g
Reading unit (d)	0,001g	0,001g	0,001g	0,001g
Verification unit (e)	0,01g	0,01g	0,01g	0,01g
Tare range	-100g	-200g	-300g	-500g
Accuracy class	II			
Working temperature	+18 ÷ +33°C			
Weighing time	<3s			
Pan dimension	φ115mm			
Balance dimension (with legs)	215(235 with legs)x345x90mm			
Balance weight	5kg			
Power supply	~230V 50Hz 6VA / =12V 800mA			
Recommended external calibration weight (OIML)	F2 100g	F2 200g	F2 200g	F1 500g

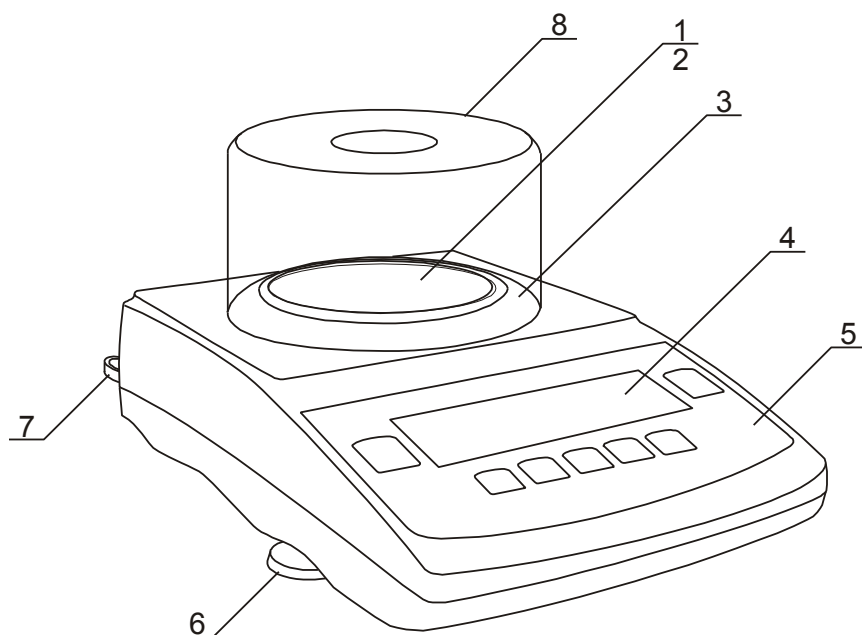
Type	AG600C AGZ600C	AG1000C AGZ1000C	AG2000C AGZ2000C	AG3000C AGZ3000C	AG4000C AGZ4000C	AGZ10C
Capacity (Max)	600g	1000g	2000g	3000g	4000g	8000g
Min load (Min)	0,5g	0,5g	0,5g	0,5g	0,5g	5g
Reading unit (d)	0,01g	0,01g	0,01g	0,01g	0,01g	0,1g
Verification unit (e)	0,1g	0,1g	0,1g	0,1g	0,1g	1g
Tare range	-600g	-1000g	-2000g	-3000g	-4000g	-8000g
Accuracy class	II					
Working temperature	+18 ÷ +33°C					
Weighing time	<3s					
Pan dimension	φ150mm	165x165 mm				195x180 mm
Balance dimension (with legs)	215(235 with legs)x345x90mm					
Balance weight	5kg					
Power supply	~230V 50Hz 6VA / =12V 800mA					
Recommended external calibration weight (OIML)	F2 500g	F2 1000g	F2 2000g			F2 5000g

**Caution:**

F1 and F2 are international symbols of calibration weight classes according to O.I.M.L. Some requirements for weight accuracy are connected with those classes.

## 5. General balance view

AG100C-AG600C balances:

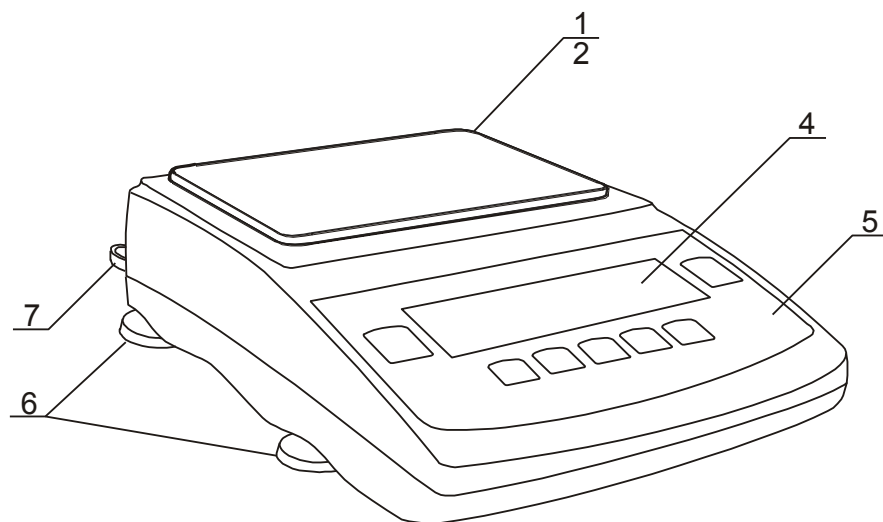


- 1 – pan
- 2 – pan support
- 3 – pan ring
- 4 – display LCD
- 5 – keys
- 6 – rotating legs
- 7 – water level
- 8 – draft shield

**Note:**

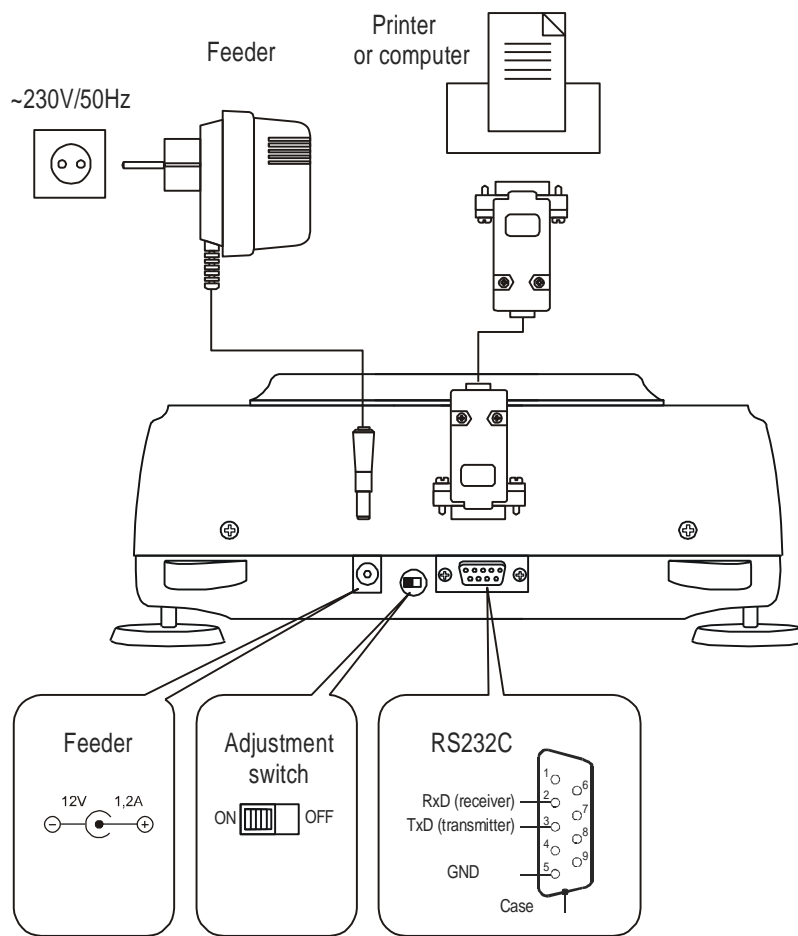
AG600C does not have the pan ring and the draft shield.

AG1000C-AG4000C balances:

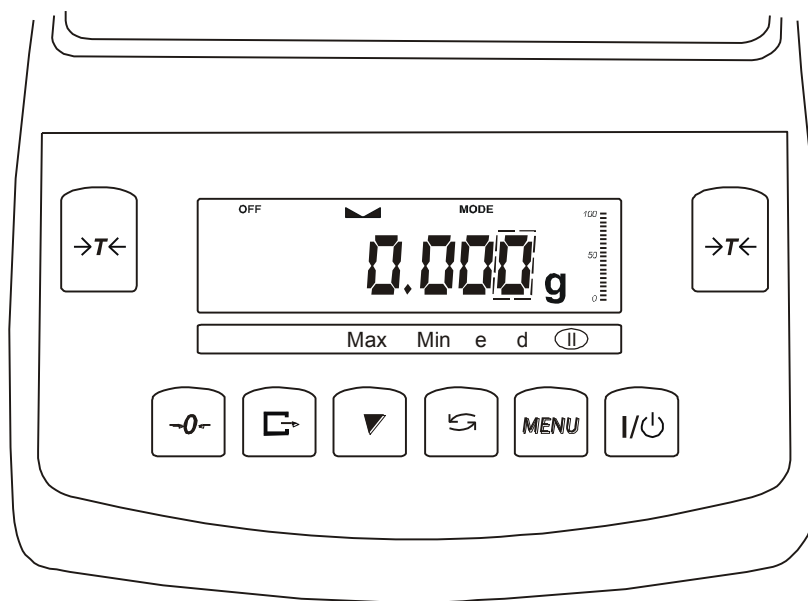


- 1 – pan
- 2 – nuts (under pan)
- 4 – LCD display
- 5 – keys
- 6 – rotating legs
- 7 – water level

## Connectors view:



## 6. Keys and indicators



Description of basic functions for keys and indicators:

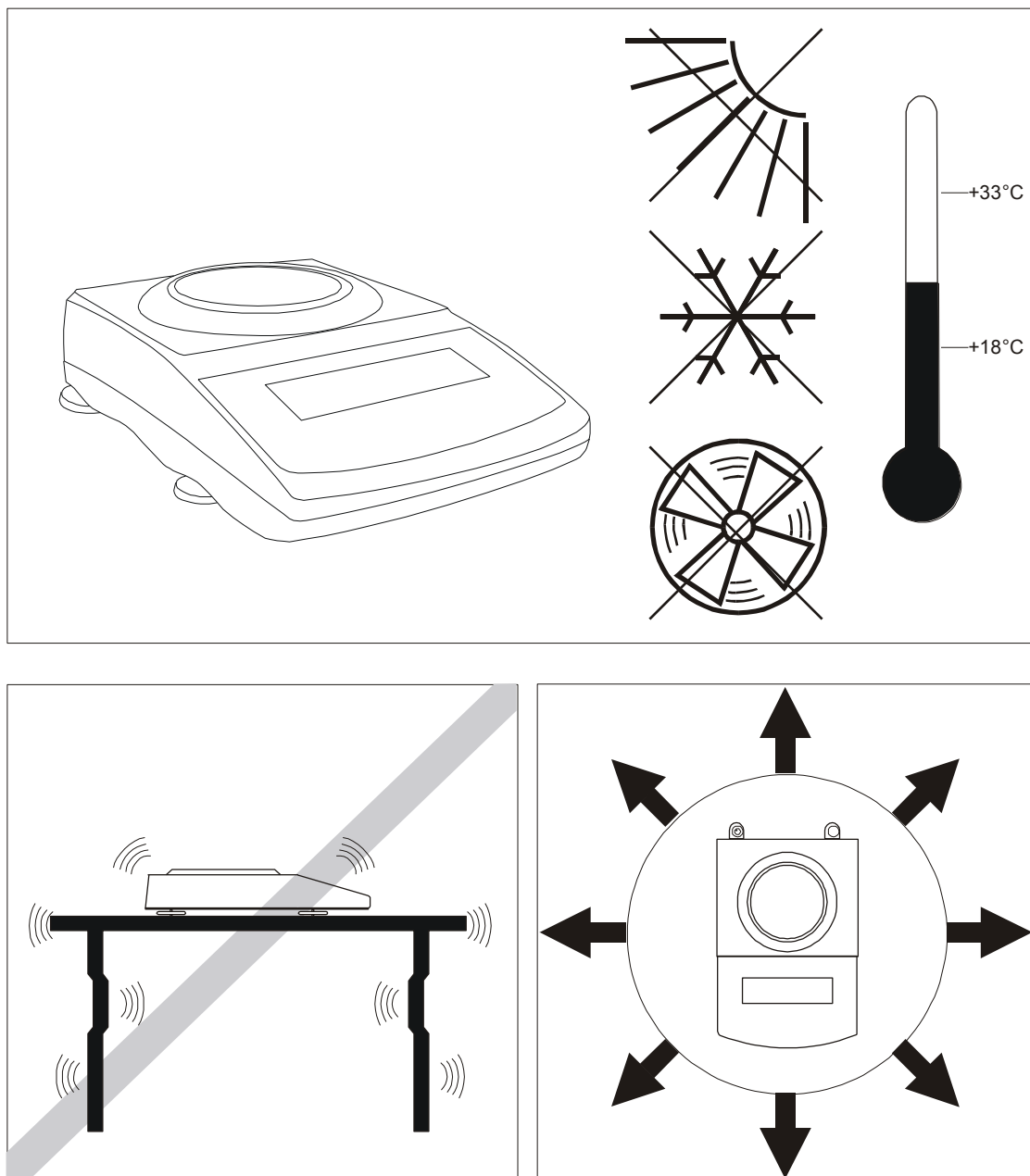
→T←	- taring (enter mass subtracted from weighed mass)/ confirmation of selected menu options,
→0←	- zeroing (option),
	- result printout (transmission),
	- internal calibration / accelerated options viewing
	- switch: special function / weighing,
MENU	- enter to special function menu,
I/⏻	- switch on / switch off (standby),
indicator	- shows stabilization of weighing result,
linear indicator	- indicator of balance load (0-100%),
OFF indicator	- appears after the balance is switched off with I / ⏻ key,
distinction of last digit	- informs that reading unit value is lower than acceptable indication error (balances with legal verification, d≠e)
Max, Min, d, e, II	- metrological parameters of the balance.

The use of keys during entering numeric values (special functions):

- increment current digit,
- insert comma,
- T← - move to next position,
- MENU - finish entering.



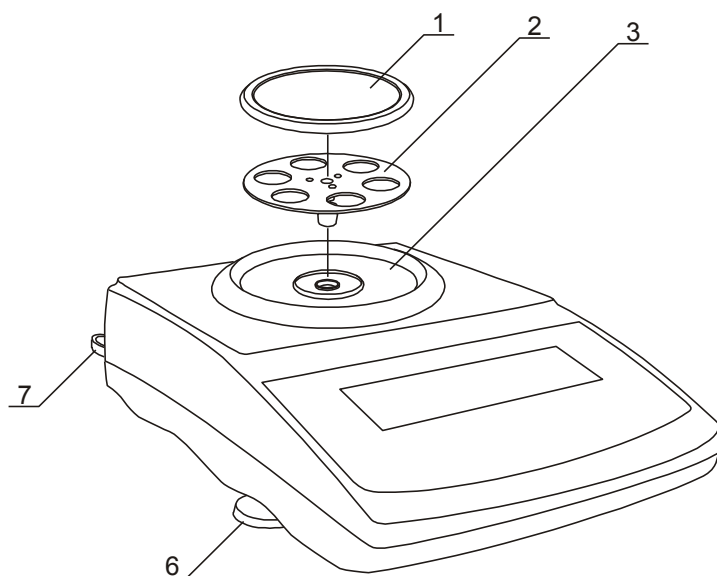
## 7. *Preparing working environment*



Location for the balance should be chosen with care in order to limit influence of the factors that can interrupt working balance. This location has to maintain proper temperature for working balance and necessary space for its operating. The balance should stay on stable table made of material that does not influence magnetically on the balance.

Rapid air blasts, vibrations, dust, rapid temperature changes or air humidity over 90% are not allowed in balance surrounding. The balance should be far from heat sources and devices emitting strong electromagnetic or magnetic fields.

## 8. Preparing balance to work



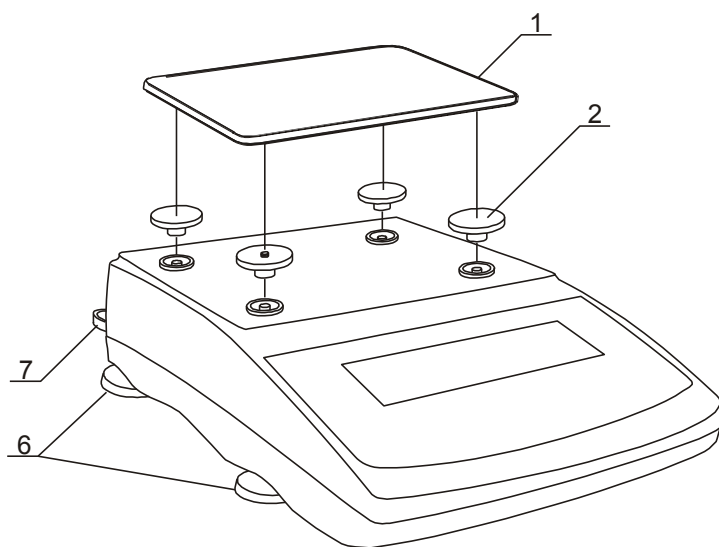
1. Take the balance, the feeder and mechanical elements of the pan out. It is recommended to keep the original scale package in order to transport the balance safely in future.

2. Place the balance on a stable ground not affected by mechanical vibrations and airflows.

3. Level the balance with rotating legs 6 so that the air bubble in water level 7 at the back of the balance is in the middle.

4. (for AGC100-AGC600) Gently insert the mandrel of pan support 2 into balance mechanism socket through the pan ring 3 and the pan 1 on (AGC600 balances have not pan ring).

5. (for AGC1000-AGC4000, AGZ10C) Place nuts 2 on mandrels that are visible in balance cover holes, put the pan 1 on nuts.



If the balance was taken from a lower temperature surrounding to a room with higher temperature, e.g. in winter, moisture can liquefy on the balance casing. Do not connect power supply to the balance, because this can cause damage or improper work of the balance. In this case leave the balance for at least 4 hours unplugged for acclimatization.

## 9. General operation principles

1. Weighed sample should be placed in the centre of the pan
2. The balance allows taring in the whole measuring range. To tare the balance press  $\rightarrow T \leftarrow$  key (on the left or on the right). Taring does not extend measuring range, but only subtracts tare value from mass value of a sample placed on the pan. To make the control of pan load easier and to avoid crossing measurement range, the balance has a load indicator calibrated  $0 \div 100\%$  Max.
3. Weighing result should be read when the indicator " $\blacktriangle \blacktriangleleft$ " lights, which signalises stabilisation of a result.
4. When the balance is not used but should be ready to work immediately, it can be switched off by pressing  $\vee \oplus$  key. The backlight of balance reading system is then switched off and the balance enters into "standby" mode, in which the balance maintains internal temperature and ability to start working with maximum accuracy. Standby mode is signalled by the *OFF* indicator. To switch the balance on press  $\vee \oplus$  key.
5. In direct sale use (d=e), make sure that  $\rightarrow 0 \leftarrow$  zero indicator is displayed before sample is placed on the pan. If not, press  $\rightarrow 0 \leftarrow$  key and wait until the balance is zeroed and zero indicator appears. In other balances the key does not operate.
6. Balance mechanism is a precise device sensitive to mechanical shocks and strokes.



Do not overload the balance more than 20% of maximum capacity.  
Do not press the pan with a hand.



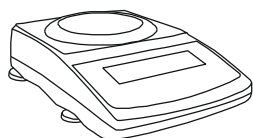
For transportation take off the pan (move it gently and lift it up) and pan support (lift it up) and protect from any damages.

7. After every change of balance position, level the balance and perform internal calibration using  $\blacktriangledown$  key.
8. The balance cannot be used to weigh ferromagnetic materials due to decrease of weighing accuracy.

## 10. Start-up

Plug feeder into 230V power supply socket. When the pan is empty plug feeder output connector into 12V socket at back of the balance. Autotests and internal calibration will be performed.

### *Steps after start-up of the balance:*



C-1	Tests of electronic components.
...	
C-5	Test of internal calibration motor test (engine heard).
▽	
AC-...	Displaying balance program version.
▽	
-CAL-	Starting internal calibration.
▽	
-----	Zeroing the balance.
▽	
LOAD C	Loading internal weight.
▽	
C	
▽	
-----	Zeroing the balance
▽	
0.000g	Balance is ready to work.

## 11. *Internal calibration*

The balance is equipped with internal calibration system, which general task is to maintain required measurement accuracy on the balance.

Internal calibration is the process of putting internal weight on automatically by balance mechanism and correcting accuracy in balance firmware. The correction is necessary because of differences between values of gravitational acceleration in the place where the balance was manufactured and in the place where it is operated, as well as due to changes of balance level and temperature.

Internal calibration is performed in the following situations:

- when ▼ key is pressed,
- after defined time interval (for legally verified balances - 2 hours),
- after temperature change (for legally verified balances – more than 2°C).

In legally verified balances time interval is set to 2 hours and defined temperature change is 2°C. In not legally verified balances those values can be set as calibration options. Starting internal calibration process is signalled with - *CAL* - message.

In order to perform internal calibration, proceed with the following:

1. Empty the pan.
2. Press ▼ key (to leave internal calibration, press ▼ second time when “-----“ is displayed).

During calibration internal weight is put three times on and obtained results are compared.

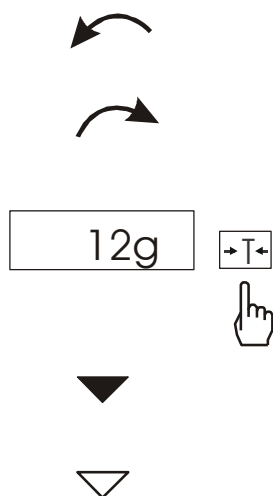
Discrepancy of results is signalled with a message and causes the balance being blocked.

Until calibration process is finished do not perform any operation on the balance. Any vibrations and shocks interfere calibration process and may delay it or deteriorate accuracy of its result.

When internal calibration is performed successfully the balance indicates zero on the display at empty pan.

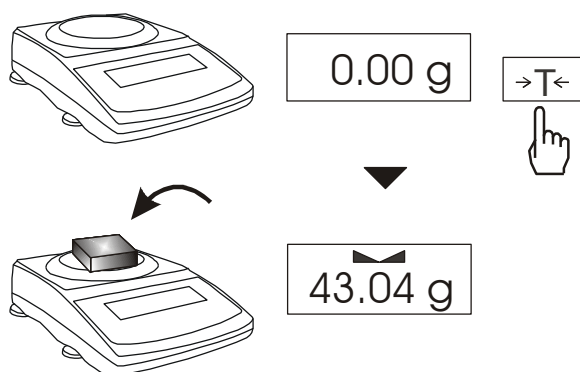
## 12. Basic functions

Following symbol graphic will be used in instruction:



- loaded pan
- unloaded pan
- press a key when ... (on left)
- forced change
- automatic change
- 

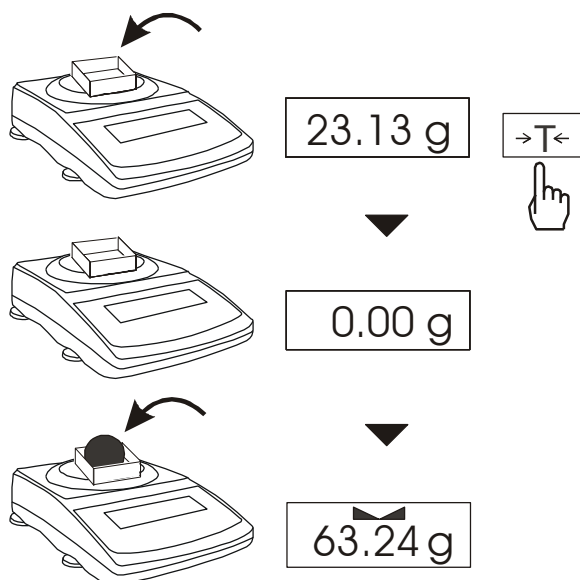
### 12.1 Normal weighing



When a pan is empty and indication is different than zero press  $\rightarrow T \leftarrow$  key.

Weighing result should be read when the indicator " $\triangle$ " lights.

### 12.2 Weighing with tare



A balance is equipped with tare equal to its range.

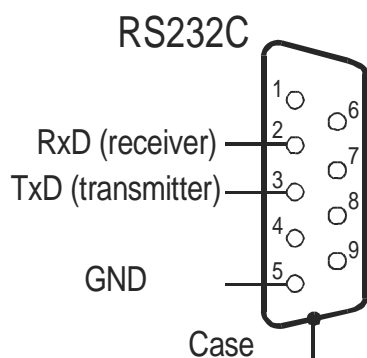
### 13. **Balance checking**


As weight indication depends on gravitational acceleration, it is advised to check balance indication accuracy before and after series of measurement using any load with known weight.

To check a balance with legal verification use calibration weight as stated in Technical Data table with valid calibration certificate. In case permissible error is exceeded it is advised to contact the nearest service to calibrate a balance.

### 14. **Connecting a balance to a computer or a printer**

The balance may send data to a computer or a printer via RS232C interface.



When cooperating with a computer, the balance sends weighing result after initialising signal from a computer or after pressing  key.

When cooperating with the balance, a computer should be equipped with a program that enables receiving and processing data from the balance.

AXIS offers computer programs to cooperate with balances. Demo versions and program descriptions are available on the website: [www.axis.pl](http://www.axis.pl):

- *Komunikacja* – free serial port testing program,
- *ProCell* – residual program for cooperation with Microsoft EXCEL and other Microsoft Windows applications (demo version).

*Detailed information for programmers:*

*The balance sends data with a following method:*

*Computer → Balance: initiation signal S I CR LF (53h 49h 0Dh 0Ah),*

*Balance → Computer: weighing result in the following format:*

*(16Bytes, LONG protocol - 8bits, 1stop, no parity, 4800bps),*

*Bytes description:*

*1 - ,, -, mark or space*

*2 - space*

*3÷4 - digit or space*

*5÷9 - digit, decimal point or space*

*10 - digit*

*11 - space*

*12 - k, l, c, p or space*

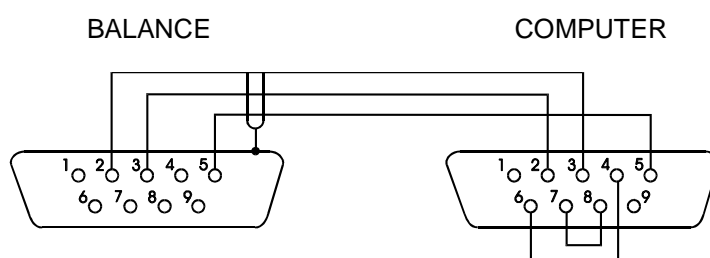
*13 - g, b, t, c or %*

*14 - space*

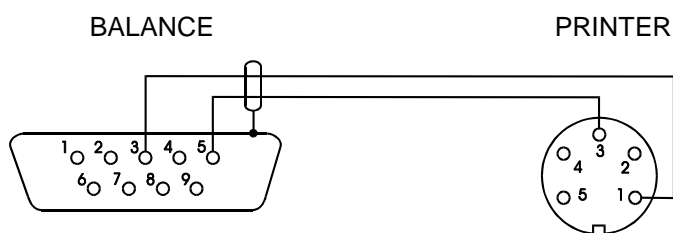
*15 - CR*

*16 - LF*

**Connection cable WK-1 (balance – computer / 9-pin):**



**Connection cable WD-1 (balance - KAFKA printer):**



**Setup of printer internal switch – printer AXIS C-001:**

SW-1	SW-2	SW-3	SW-4	SW-5	SW-6	SW-7	SW-8
on	off	on	off	off	on	off	off



## 15. Special functions description

List of available functions:

- ❑ menu customization function (*ACtIV*),
- ❑ removal of all function from menu (*dEFAUL*).
- ❑ autozeroing function (*AutoTar*),
- ❑ pieces counting function (*PCS*),
- ❑ function for setting serial port working (*SEndIng*),
- ❑ function for setting serial port parameters (*RS232*),
- ❑ extended calibration function (*CALibr*),
- ❑ changing measurement unit (*UnIt*),
- ❑ percentage weighing function (*PErCEnt*),
- ❑ recipe weighing function (*rECIPE*),
- ❑ entering tare function (*tArE*),
- ❑ force measurement (*F*),
- ❑ maximum value indication function (*UP*),
- ❑ anti-disturbance filter function (*FILtEr*),
- ❑ weighing large animals function (*LOC*),
- ❑ average calculating function (*AVErAGE*),
- ❑ determining solids and liquids density function (*hYdro*)\*
- ❑ statistical calculations (*StAt*)- option\*
- ❑ paperweight calculation function (*PAPEr*)\*

function with additional equipment require:

- options with the clock:
  - setting current date and time function (*dAtE*)
  - total weight function (*totAL*)
- options with the transoptors connectors:
  - checkweighing function (*thr*)

\*depending on scale memory space limitation this function replaces other special function

Other special functions may be enabled as an option on customer request (described in additional brochure when ordered).

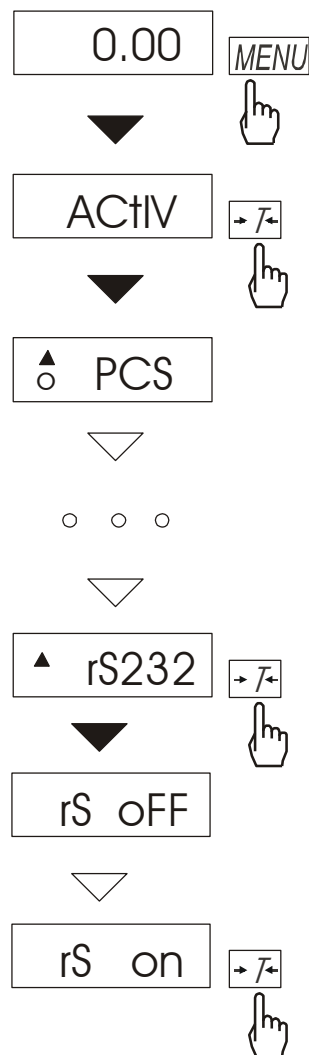
Function menu is displayed after press MENU button. Functions are displayed with increasing numbers: F1-PCS, F2-AU<sub>t</sub>, etc.



For easy access to the most frequently used functions, use *ACtIV* function to select functions to be displayed in functions menu.

When special function is active, *MODE* indicator is displayed.

## 15.1 Menu customization function (ACtIV)



Among available user functions it is possible to select these, which should be displayed after pressing *MENU* key. It allows avoiding displaying whole list of available functions, which makes operation time longer.

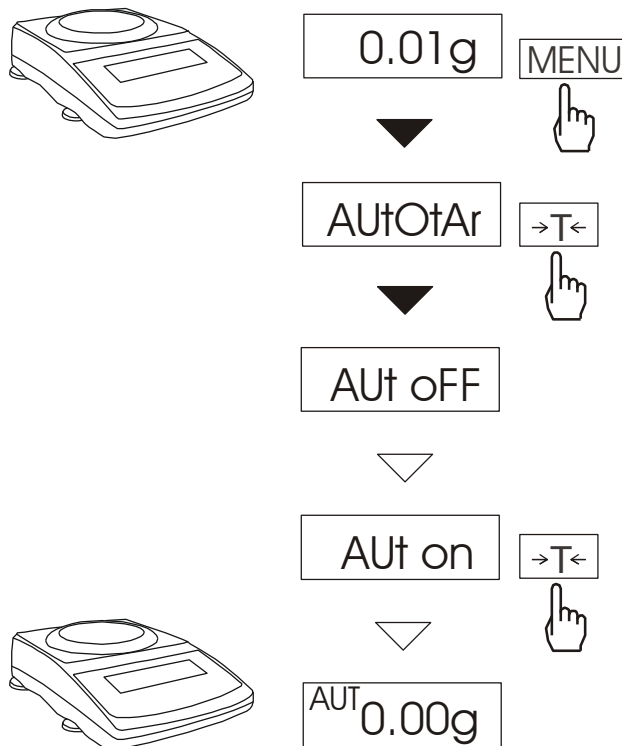
Operation sequence shown in the pictures on the left causes adding function for setting serial interface RS232C parameters (*rS232*) to function menu.

After switching on *ACTIV* function a dot is displayed on the right side (to distinguish from regular menu). Chosen functions are displayed with a dot on the left side.

In every moment, it is possible to restore primary (manufacture) settings choosing *dEFAULT* special function.

In order to delete this function from menu in last operation choose *rS oFF* instead of *rS on*.

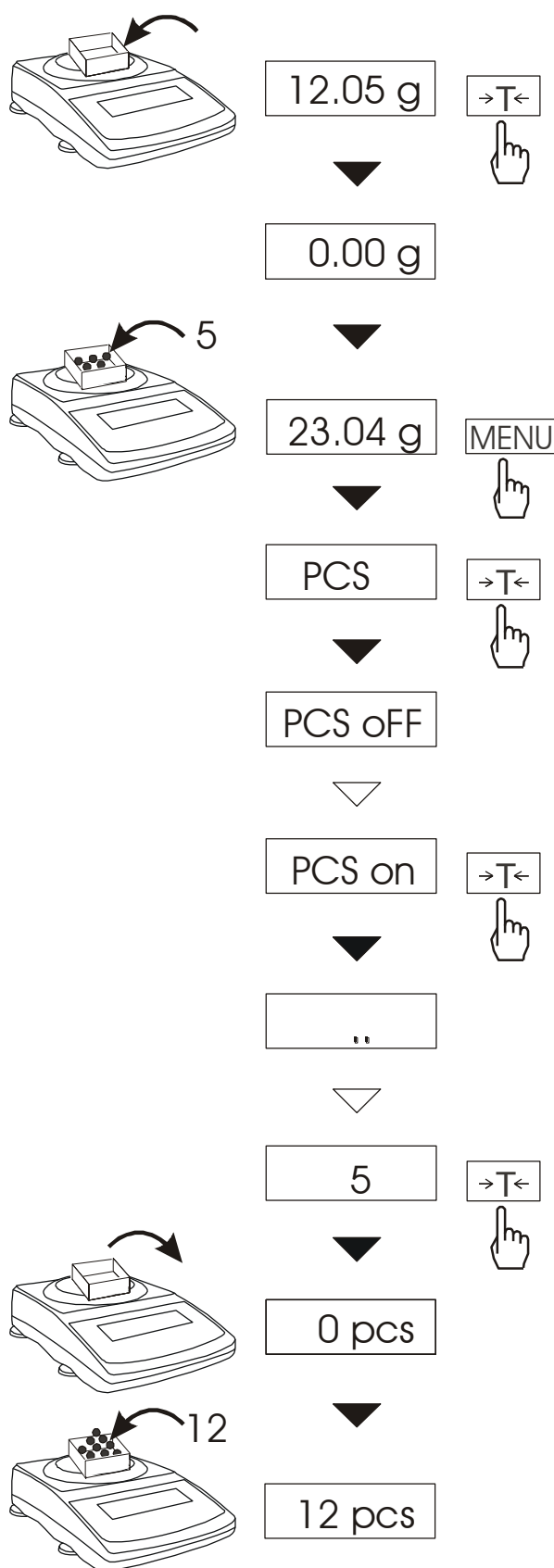
## 15.2 Autozeroing (AUtOtAr)



When AUtOtAr function is activated, a balance automatically keeps zero indication if a pan is empty or if zero indication was acquired by pressing **→T←** key. To leave the function press **MENU** key, then with **→T←** key chose **AUtOtAr** and **AUt oFF**.

**Note:** Autozeroing function is activated automatically for 10 min. after switching-on

### 15.3 Pieces counting (PCS)



This function enables to count identical pieces, e.g. turnbuckles or buttons.

A measurement is performed in two phases:

- first phase - single piece weight calculation on the basis of defined pieces amount (5, 10, 20, 50, 100, 200 or 500 pieces),
- second phase – pieces counting.

It is advised that single piece weight is not less than one reading unit and sample weight used in first phase is bigger than 100 reading units.

To leave function press F key and then with **→T←**, key chose **PCS** and **PCS oFF**.

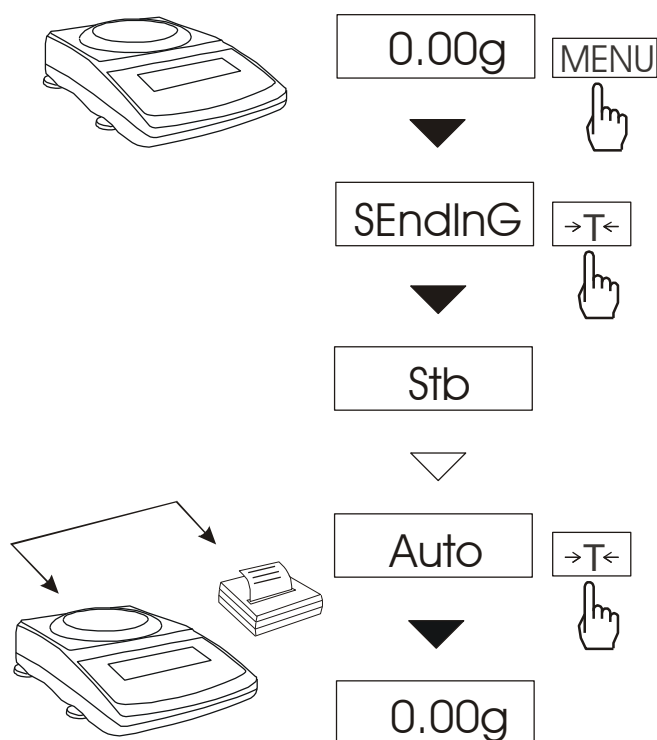
**Note:**

*Err-3 communicate signalises that a sample was not put on a pan. The same communicate appears if single piece weight is less than one reading unit (it is possible to count pieces but measuring error is bigger).*




*To chose previously used pieces amount select “..” in first phase.*

*During pieces counting **→T←** key function does not change*

## 15.4 Serial port working mode selection (SendInG)

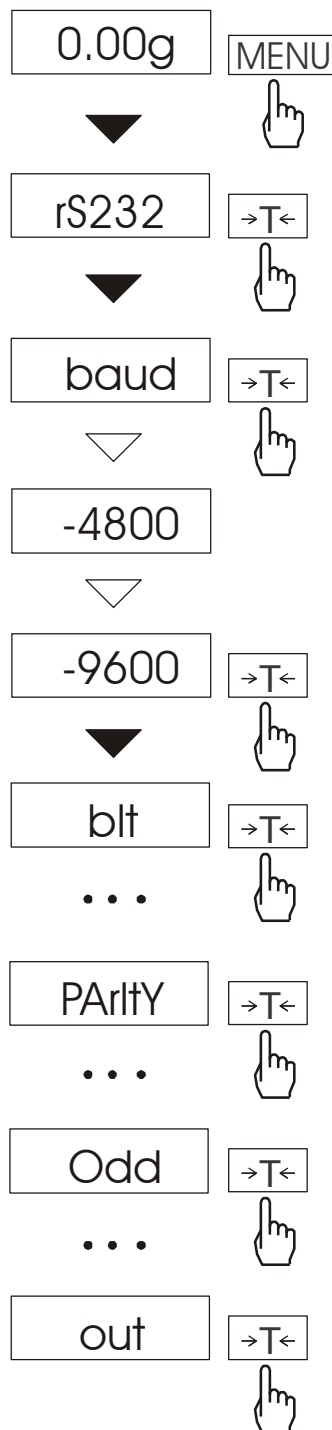


The function enables to set the serial port working mode.

- *StAb* – transmission after using  key and indication stabilization,
- *no – StAb* – transmission after using  key without stabilization,
- *Auto* – after putting and taking off the weighed object without using ,
- *Cont.* – about 10 results per second.

*Auto* mode is suggested when working with printer.

## 15.5 Serial port parameters setting (rs232)



The function enables to set the following transmission parameters (standard parameters underlined:

- transmission speed (*bAud*: *1200*, *4800*, *9600*, ...),
- the number of bits in a byte (*bit*: *7*, *8*),
- parity control (*PArItY*: *0*, *1*; *Odd*: *0*, *1*),

To set desired transmission parameters activate *RS232* function, choose appropriate parameter and press *→T←* key to accept needed parameter value. The example at the left presents how to set transmission speed value to 9600bps.

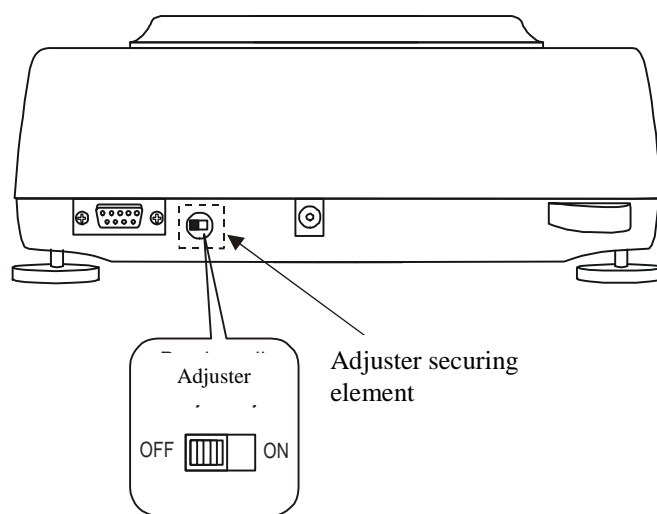
To leave the function choose *out* option

## 15.6 Adjusting a balance (Calibr)

If balance indications exceed permissible error it is necessary to adjust a balance. To calibrate a balance use calibration weight as stated in Technical Data table (or of better accuracy) with valid calibration certificate.



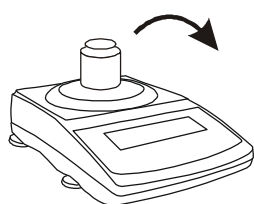
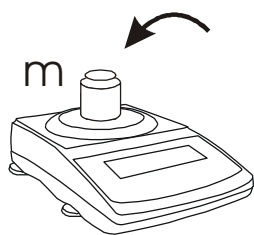
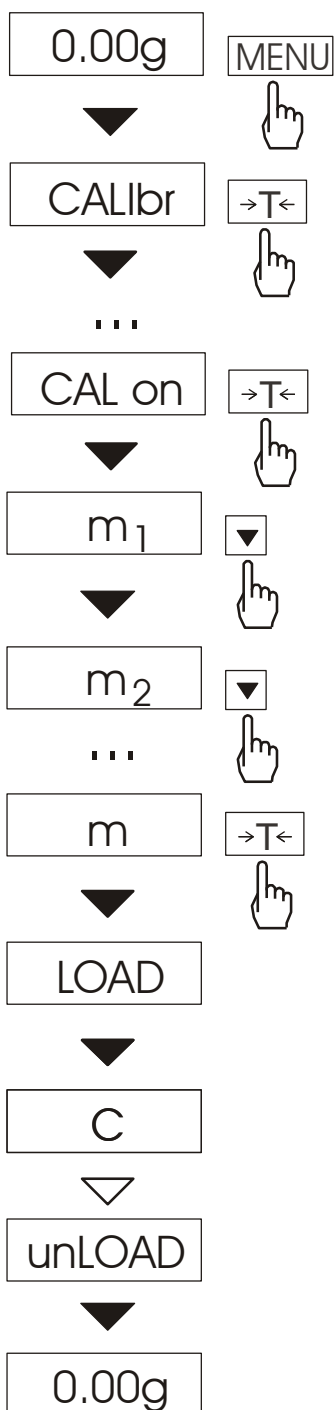
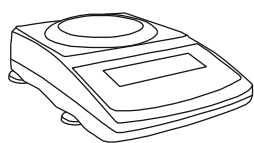
To adjust a balance it is necessary to break protective marks – please contact the nearest service for legal verification in a place of installation or the nearest Measurements Office.



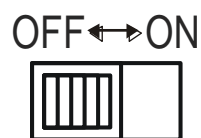
In legalized scales to perform calibration it is needed to change adjuster position. Adjuster is situated under adjuster securing element.

Calibration report (CAL Prn):

Data:	CALIBRATION REPORT
-----	
FACTORY NUMBER:	...
PROGRAM NUMBER:	(version, date)

**Operation sequence:**

Remove a protective mark from a calibration switch at the back of a balance.



Switch to Pr ON position using small screwdriver (signalised on a display).

Press *MENU* to call special functions. Press *→T←* to choose *CALibr* and *CAL on*.

Press ▼ several times to select desired weight value. It is advised to use as great weight value as possible.

Press *→T←* to accept.

When *LOAD* appears put the weight on a pan.

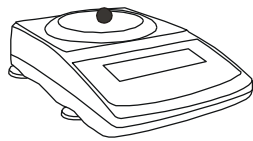
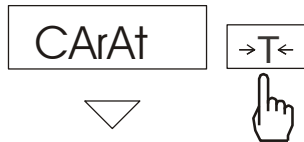
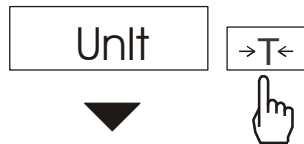
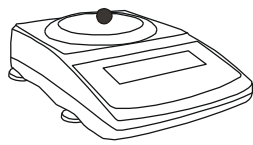
Wait.

When *unLOAD* appears take off the weight.

Switch to Pr OFF position using small screwdriver ( *Pr ON* disappears).



## 15.7 Weighing unit selection (Unit)

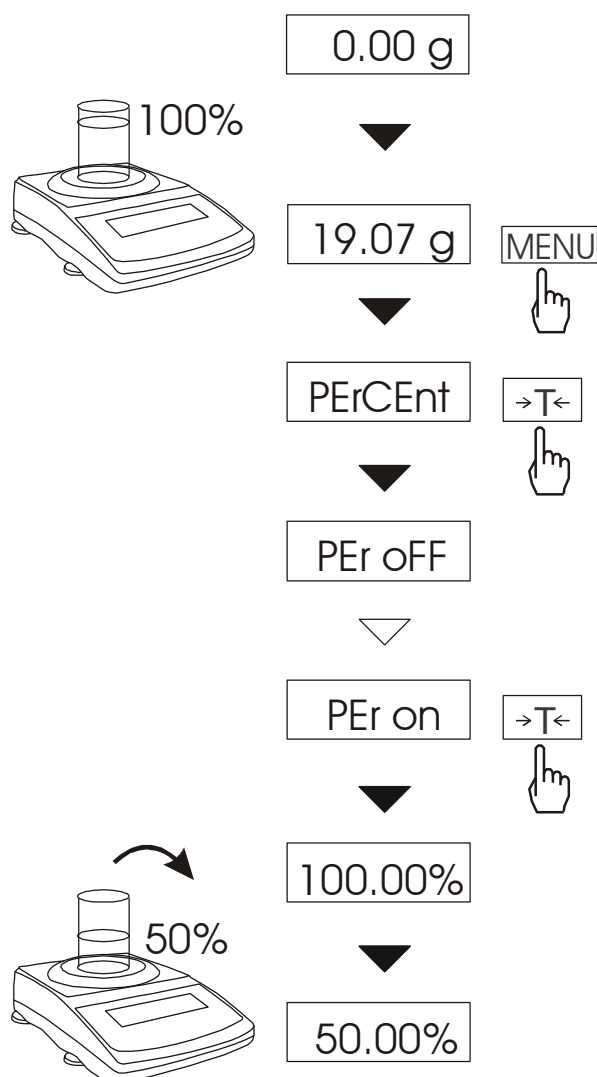


Use this function to choose weighing unit:

- carats (1 ct= 0,2 g),
- pounds (1 lb=0,454kg),
- grams.

The example presents how to set carats as weighing unit.

## 15.8 Percentage weighing (PErCEnt)



This function enables to display weighing result as a percentage of a reference sample.

A measurement is performed in two phases:

- first phase – weighing a reference sample,
- second phase – measuring specific sample as a percentage of the reference sample.

Weighing result is displayed in different format, depending on the reference sample weight value. For values of 0÷3,5% of weighing range the format is “100.0”, for values 3,5÷35% it is “100.00” and 35÷100% - “100.00”

The function has the following options:

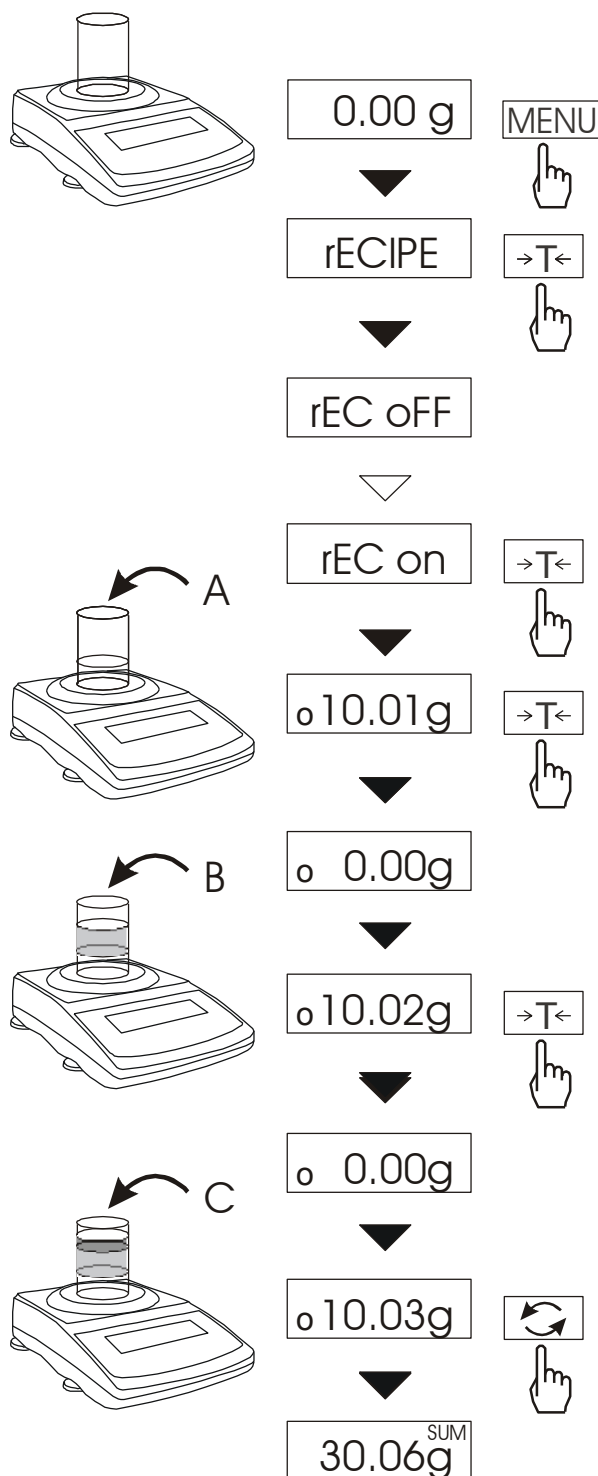
- *PEr oFF* – disables the function,
- *PEr on* – stores current indication as 100% and activates percentage weighing,

### **Note:**

*Err-3* communicate signalises that a sample was not put on a pan. The same communicate appears if 100% piece weight is less than  $0,5 \cdot \text{Min of scale}$

When the function is activated ->T<- key function does not change.

## 15.9 Weigh summation (*rECIPE*)



This function enable to weigh few ingredients in one container and to display aggregated sum of all ingredients.

The function has the following options:

- rEC oFF* – leave the function and display aggregated sum of all ingredients,
- rEC on* – activate the function,
- rEC Con* - return to previous series of weighing.

Before weighing each ingredient (A, B, C, etc.) remember to tare the balance.

To read aggregated sum of all previously weighed components press ↺ key or use *rEC oFF* option. To return to ingredients weighing press ↺ key again.

### Note:

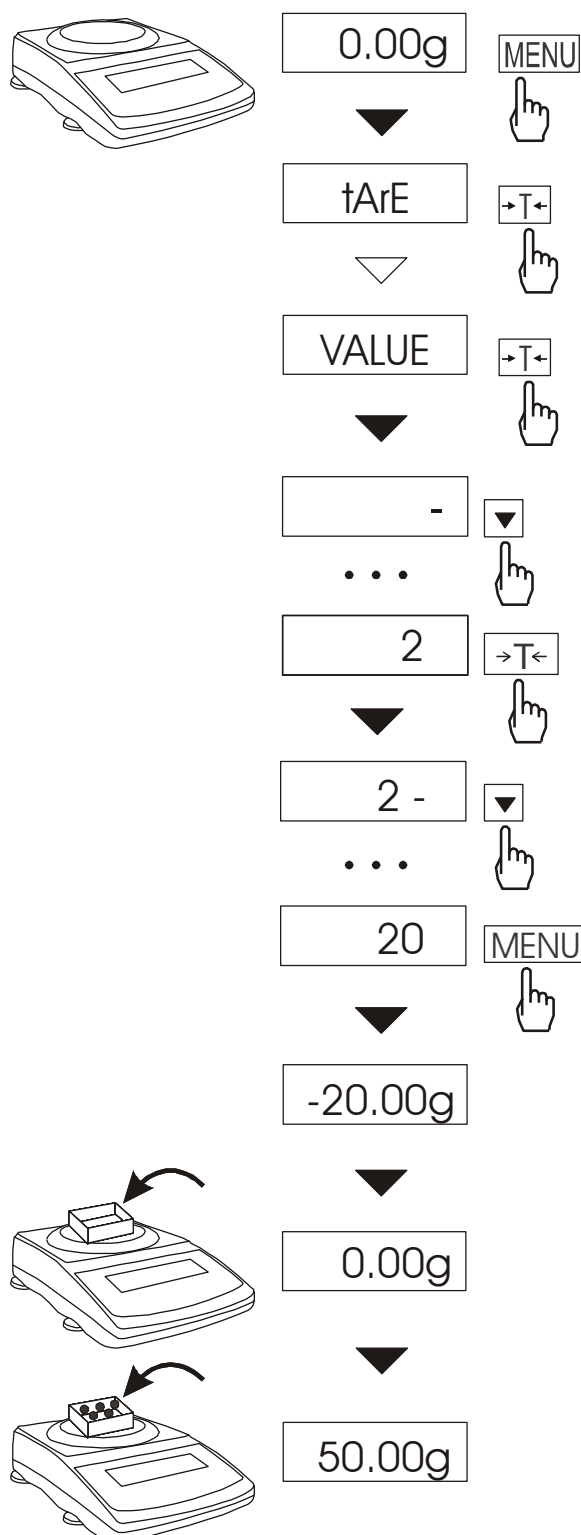
When *rECIPE* function is active, the sign *o* is displayed at the left of the display.

When *rEC oFF* option was used, *SUM* indicator disappears after pressing →T← key.

## 15.10 Tare memorizing function (tArE)

This function enables to measure gross weight of a sample placed in a container of a known weigh value (stored in the memory) and to display calculated net weight of the sample. Tare value is recalled from the memory with  $\rightarrow T \leftarrow$  (or  $\rightarrow 0 \leftarrow$  when pan is unloaded). Tare value may be entered using the keypad or by sampling container weight from the pan.

### Inserting tare value using keypad:



After pressing **MENU** key and choosing **tArE** function using  $\rightarrow T \leftarrow$  key, functions below are displayed:

- **tAr OFF** – function off,
- **tAr on** – function on with tare inscribed earlier,
- **PAn** – actual mass on pan setting as tare,
- **VALUE** – inscribing tare using:  $\nabla$ ,  $\square$ ,  $\rightarrow T \leftarrow$  i **MENU**.

Choose tare inscribing function using  $\rightarrow T \leftarrow$  key.

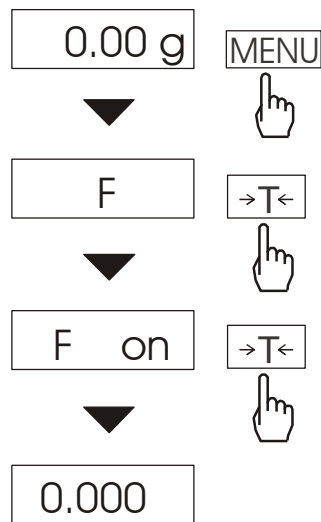
After inscribing scale works with new tare value. The scale will show nett mass (the actual object mass minus tare value).

Each using of  $\rightarrow T \leftarrow$  key (or  $\rightarrow 0 \leftarrow$ , when the pan is unloaded) will cause zeroing, and deleting memorized tare value (user will see minus indication).

### ATTENTION:

Tare value is also memorized after the scale is turned off.

### 15.11 Force measurement function (F)



Function activation causes displaying measurement results in force units (mN).

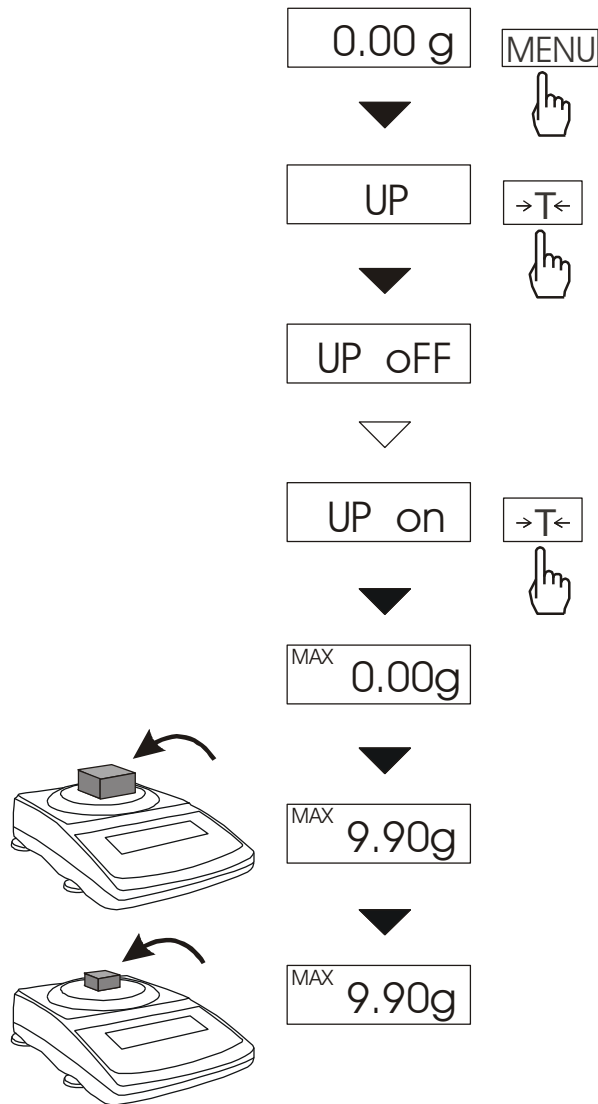
Press *MENU* key .

Using *→T←* key choose *F* function, and then *F on*.

*Attention:* 1mN≈0,1019g

### 15.12 Function for maximum value indication (UP)

This function allows holding on display maximum value shown by the scale in a while



Before measurement the scale should be tared.

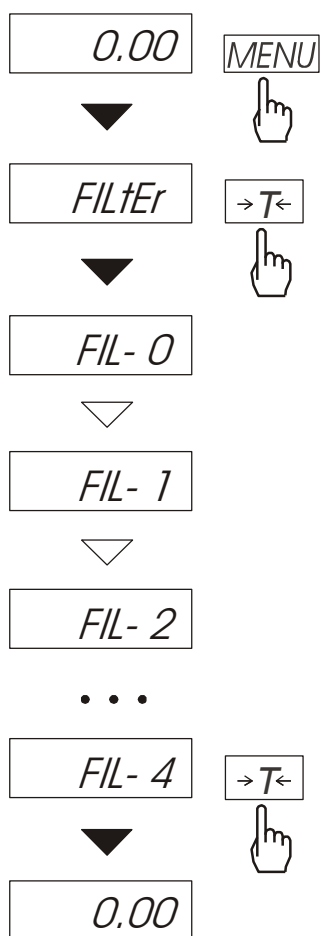
After using *MENU* key, choosing *UP* function, and then *UP\_on*, the highest mass result will be hold on display.

Pressing **→T←** key will cause result zeroing.

#### **ATTENTION:**

*Autozeroing function and the stabilisation indicator are deactivated when UP function is running. Weighing result is continuously averaged from 5 measurements.*

### 15.13 Anti-disturbance filter function (*FILtEr*)



This function allows using digital filter with selected intensity during weighing. Filter reduces the influence of mechanical vibrations (air blasts, base vibrations) on measurement result.

Press *MENU* key and select *FILtEr* pressing **→T←** key.

The following options will be shown successively on display:

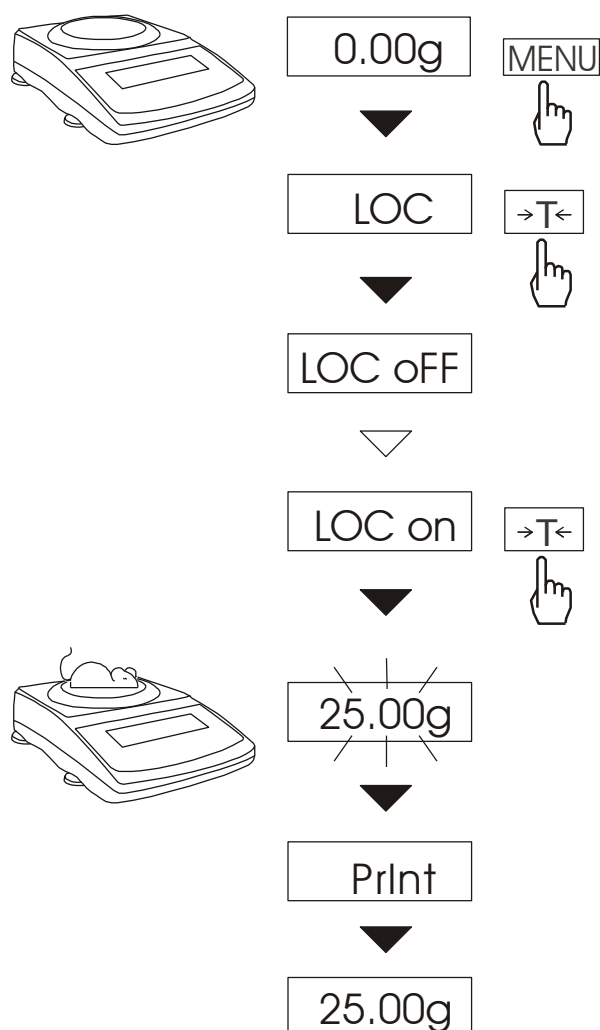
- *FIL OFF* – filter off
- *FIL-1* - filter I (weak)
- *FIL-2* - filter II (medium)
- *FIL-3* - filter III (sharp)
- *FIL-4* - filter IV (very sharp)

Select one of four filters. This will cause starting weighing with selected filter.

In order to go back to normal weighing use *MENU* key once more and choose *FILtEr* and *FIL OFF*.

### 15.14 Function for weighing animals (LOC)


The function allows weighing animal moving on the scale.



Press *MENU* key.

When *LOC* is displayed press →T← key.

The following options appear on display successively:

- *LOC oFF* – out of function,
- *LOC on* – automatic measurement after loading the scale,
- *LOC Prn* – measurement initiated by pressing  key.


When *LOC on* is displayed press →T← key.

Tare the scale using →T← key if necessary and place the animal on the pan.

Wait until the weighing result is averaged – scale display will be blinking. Then scale will show stable averaged result and will send it through serial port. Final result is displayed on the display and send via serial port to computer or printer.

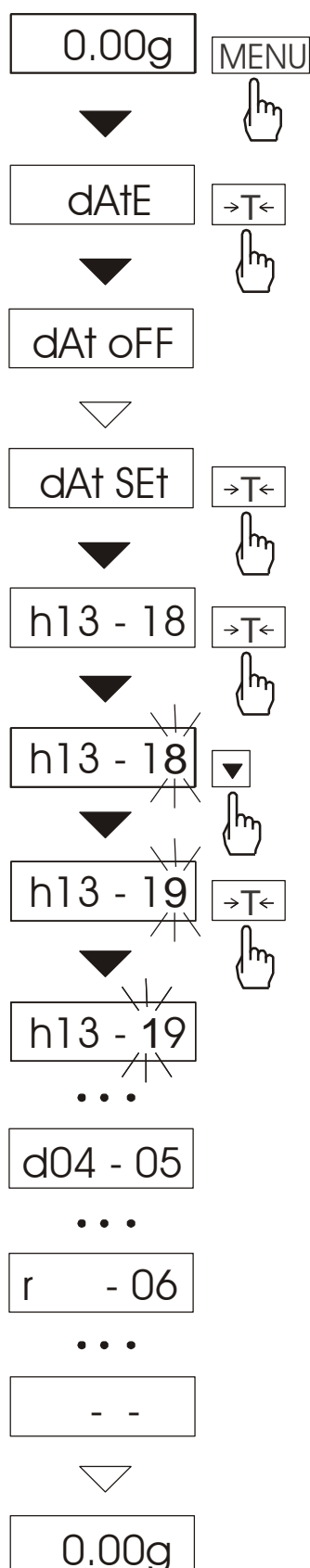
The result remains on display for about 30 second.

#### **Important notes:**

1. The loads less than Min are not averaged.
2. In the case when placing the animal takes more than 5s, it is advised to use *LOC-2* option (measurement initiated manually). It will allow performing measurement in right moment pressing  key.



### 15.15 Date and time setting (dAtE)



This function enables to set current date and time of internal balance clock and enable/disable date and time on weighing result printouts.

Options:

- *dAt oFF* – deactivate date printout,
- *dAt on* – activate date printout (using key),
- *dAt SEt* – change date and time.

The example at the left presents how to set current date and time.

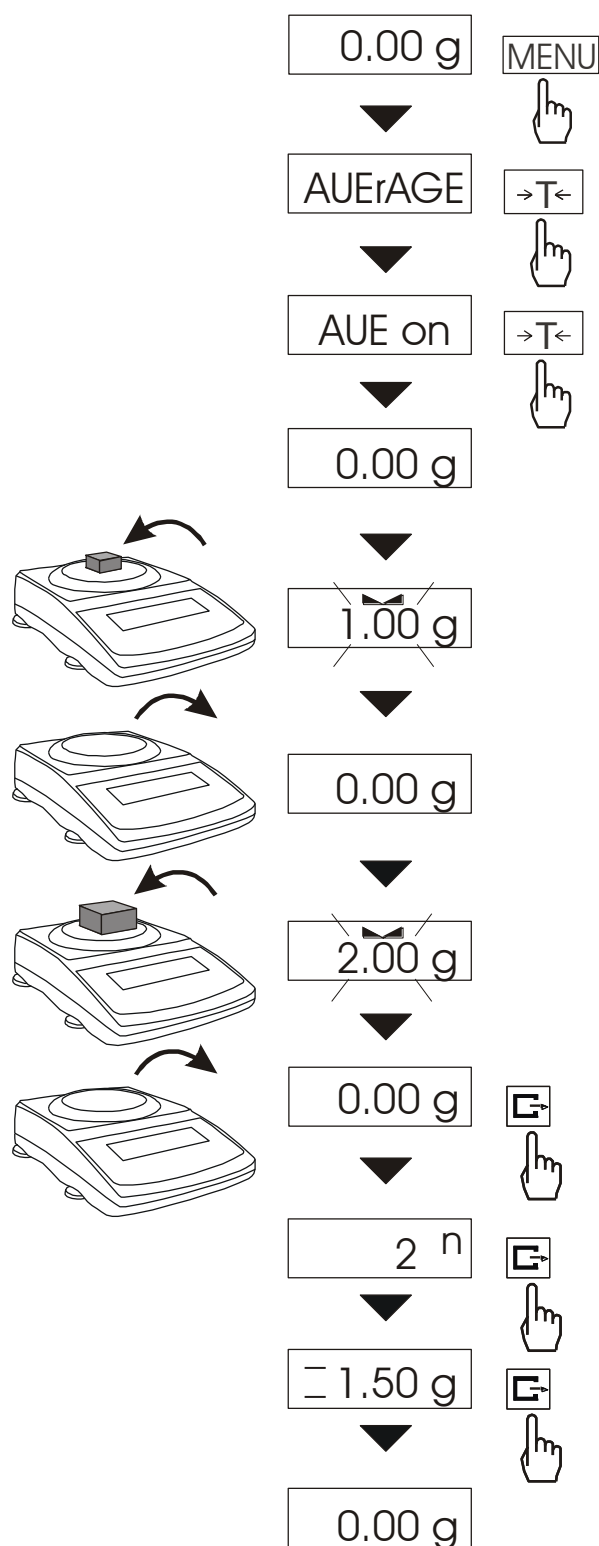
Time format: *h gg – mm*  
(g - hour, m - minute)

Date format: *d mm – dd*  
(m - month, d - day).

Year format: *r - rr*  
(r - two last digits of a year).

## 15.16 Average calculation function (AVERAGE)

The function allows for calculating average value of performed measurement series. During series of measurements successive results are registered automatically when scale indication is stabilised.



Press *MENU* key and select *AUErAG* pressing  $\rightarrow T \leftarrow$  key.

The following will be shown successively on display:

- *AUE oFF* – leaving function,
- *AUE on* – measurement with average calculation.
- *out*

Select *AUE on* using  $\rightarrow T \leftarrow$  key. It will allow weighing with simultaneous storing results into summing register for average calculation

Measurement registration is performed automatically in the moment when scale indication becomes stable. Short time displaying of „- - “ denotes that load can be taken off and new one can be put on. Results above scale Min are registered only. Number of measurements is limited to 9999.

In order to read average value  $\square \rightarrow$  key should be used.

- first pressing causes displaying number of measurements (n).
- second displaying causes displaying average value (=).
- third pressing allows continuing average calculation.

If a printer is connected to scale the following report will be printed :

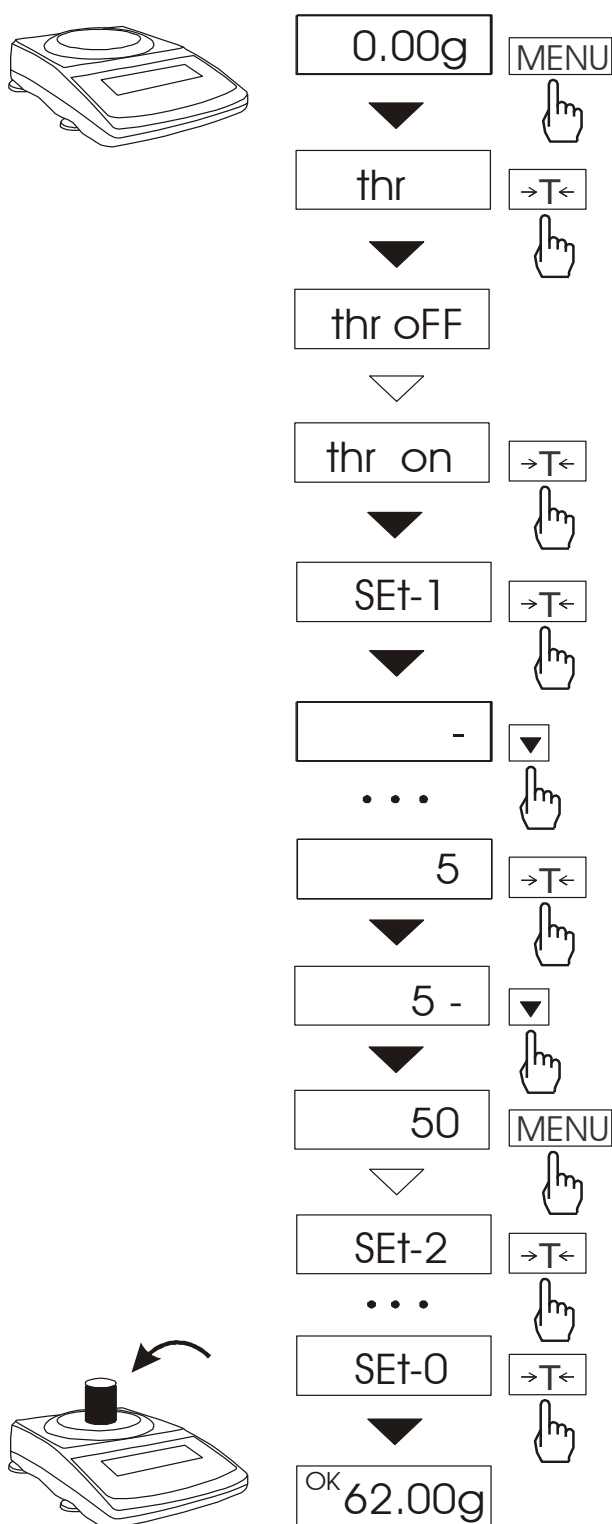
Date: ...	Time. ...
MEASUREMENS No	= ...
AVERAGE VALUE	= ...

In order to finish calculation press *MENU* key and then select *AUEr* i *AUE OFF*.

### 15.17 Threshold comparing function (thr)


This function allows comparing weighing result with two programmed reference values: lower and upper threshold. Comparison result is signalled with indicators (MIN, OK, MAX) and sound signal generated when threshold values are exceeded.

#### Operation sequence:



Press *MENU* key and choose *thr* pressing →T← key.

The following options are displayed successively:


- *trESh oFF* – deactivate the function,
- *trESh on* – activate the function,
- *trESh Prn* – check last threshold values (press  key several times),
- *thr CFG* – function configuration (working mode, buzzer, flashing setting).

Choose *thr on* option using →T← key. The following options for entering thresholds are displayed:

- *SEt-0* – go to weighing with signalling threshold excess,
- *SEt-1* – set lower threshold value,
- *SEt-2* – set upper threshold value,
- *SEt-3* – set zero signalisation threshold.

Using →T← key select *SEt-1* option.

Set lower threshold value using the following keys:

- ▼ – digit increase,
-  – decimal point,
- T← – move to next digit,

*MENU* – finish.

Then select *SEt-2* option and enter upper threshold value.

Choosing *Set-3* option will cause starting work with signalisation of exceeding thresholds and zero.

To leave the function, press *MENU* key and then choose *thr* and *thr-0* options.

If the comparison result is :

- smaller than lower threshold – the scale signals MIN (yellow colour),
- between threshold values - the scale signals OK (green colour, with the short sound signal),
- greater than upper threshold - the scale signals MAX (red colour, long sound signal).

The checkweighing results can be use to control:

- optical indicator (*Indication* mode),
- batching devices (*Batching* mode).

If we choose **thr CFG** option following options will appear:

- thr Out (working mode setting),
- thr buZ (buzzer work settings: EHC – buzzer turns on after exceeding threshold; STB – signal on after result stabilization in OK section),
- thr FLA (flashing on when lower or upper threshold is exceeded)
- out

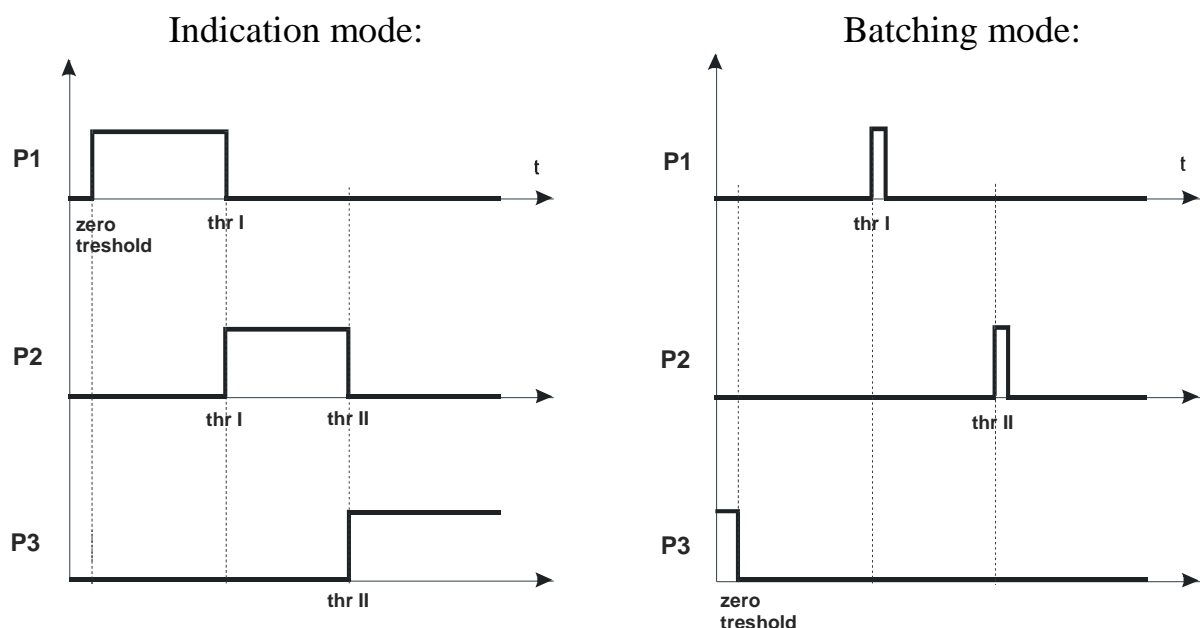
User can choose from 3 working modes for thr out.

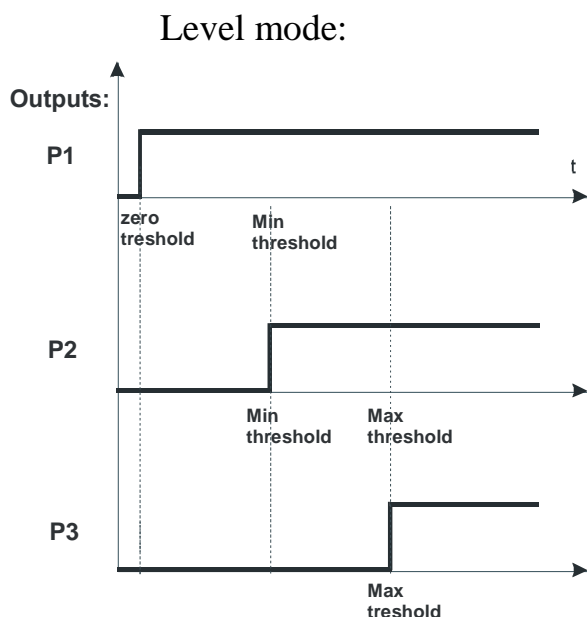
After choosing *thr Out* option following options display:

- *Out off*,
- *Out IPL* (batching mode),
- *Out bSt* ( level mode),
- *Out SGn* (indication mode).

Standard scale is set for cooperation with optical indicator.

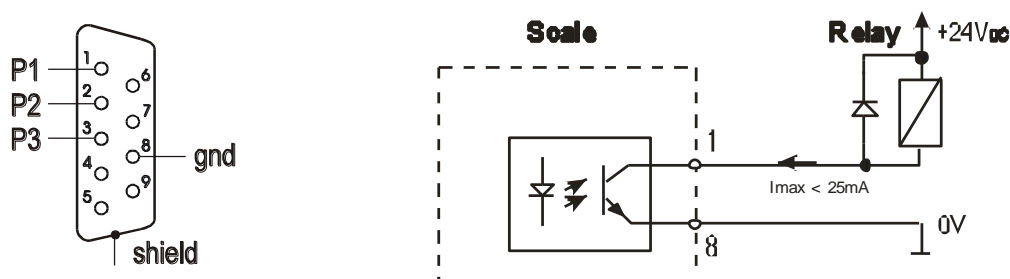
On the chart below output states are shown during increasing load on the scale for both working modes:





In *Batching* mode on P1 (thr I) and P2 (thr II) outputs short-circuit impulses appears for time of 0,5s. On P3 (zero) output short-circuit state appears when indication does not exceed threshold value signalling zero load.

*Relays* connection diagram:



*Relays* output is the open collector transistor output with load capacity 25mA / 24V. Transmitter inputs must be protected with diodes, e.g. 1N4148.

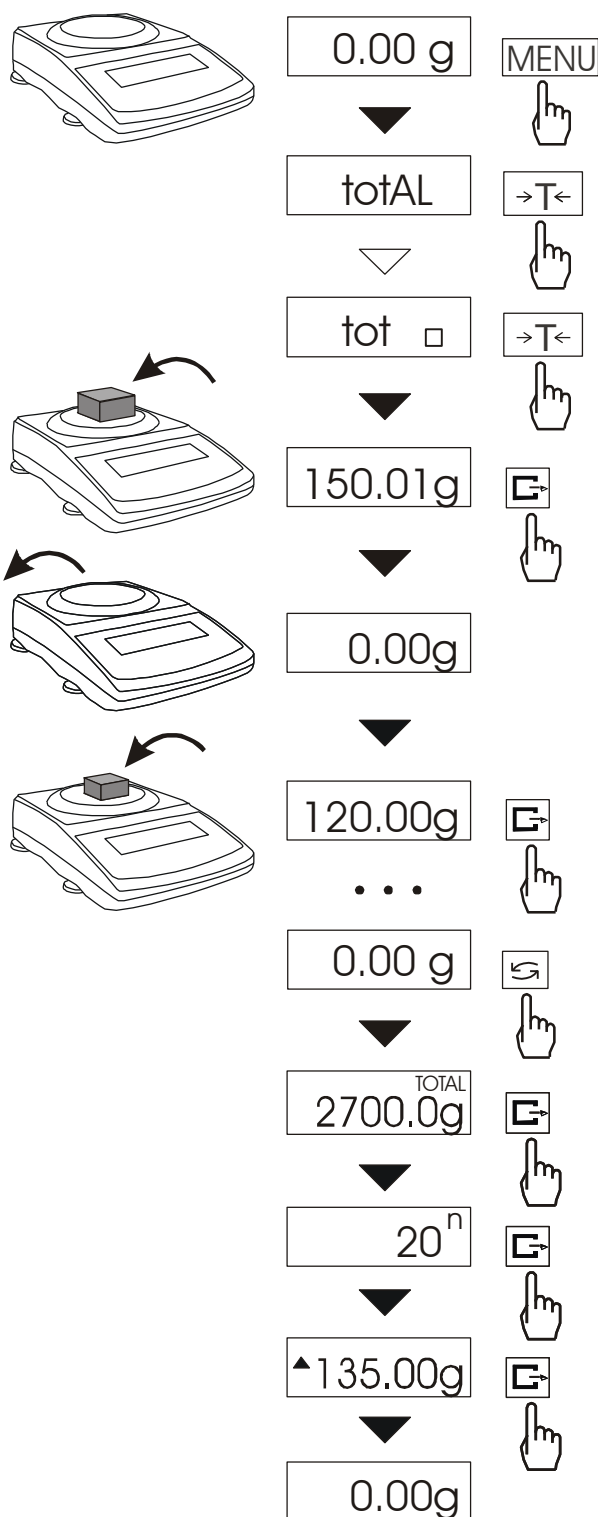
It is advised to use MS3K/P electronic board (sold separately), consisting of RM96P transmitters, with DC24V input voltage and AC250V, 3A output.

### **Important notes:**

1. After switching the scale on, both thresholds are set to maximum values.
2. When setting upper threshold value, pay attention that its value is not below lower threshold value.
3. Setting lower and upper threshold value is possible after sending appropriate orders from computer, what is described in scale user manual

## 15.18 Total weight function (totAL)

The function allows calculating total weight for series of measurements, which can be greater than scale capacity. It allows calculating total weight as well as average value.



Press **MENU** key.

When **totAL** is displayed press **→T←** key.

The following options appear successively:

- **tot Prn** - report printout without clearing total register,
- **tot oFF** - clearing total register, report printout and leaving the function,
- **tot □** - working with receipt printout after each measurement,
- **tot** - working without receipt printout.

Press **→T←** key when **tot □** is displayed.

Perform measurement series pressing **↵** key for storing results into total register.

In order to display results press **↵** key. Also it can be done by using **totAL** function and choosing option **tot Prn**.

The results are display in the following sequence:

- total weight ( $\equiv$ )
- number of registered measurements (n),
- average value ( $\equiv$ ),

Pressing again **↵** key *enables* kontynuować sumowanie ważeń bez zmiany zawartości rejestrów.

In order to go back to total weighing without zeroing total register press **↵** key third time.

To leave the function with clearing total register, select *total* function from menu and choose *tot-0* option. When It will cause the scale prints the communicate informing about clearing registers.

The form of receipt after each measurement:

Date:	...	Time.	...
measurement no		weight	
measurement no		weight	

Report form:

Date:	...	Time.	...
TOTAL WEIGHT		=	
NUMBER OF SAMPLES		=	
AVERAGE VALUE		=	

**Note:**

*When the scale has not an internal clock, Date and Time do not appear on printout.*

*Maximum number of measurements 99 999.*

*Maximum total load 99 999 000d.*

*The weighing unit of the total value from the register (Total) is the same as the weighing unit stated on the keypad or is 1000 times greater, what is signalled by “o” indicator at the left of the display.*

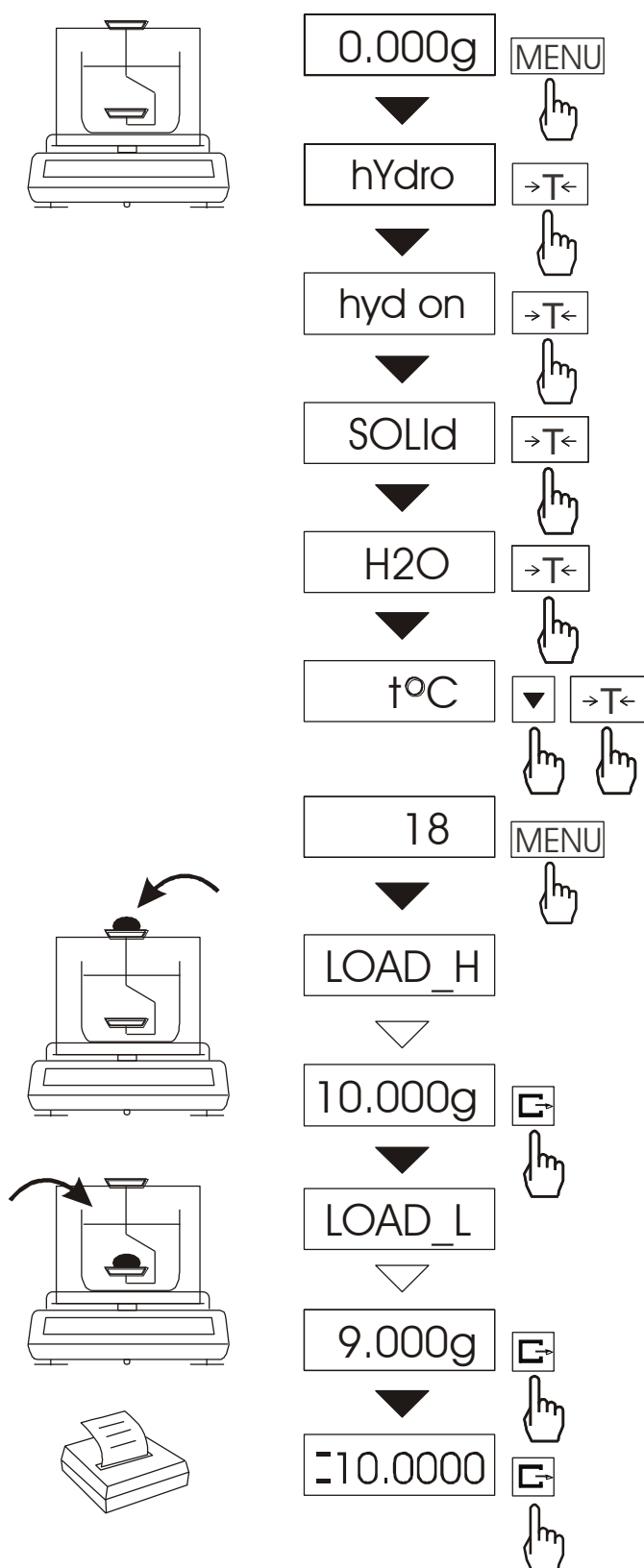
*If the registered value is too big to be displayed, “E” communicate appears on the display.*

*If the number of series is too high and cannot be displayed, “Err1” communicate appears on the display.*

## 15.19 Density determination (hYdro)

The description below describes density determination using HYDRO kit. In case below-balance weighing, operation sequence does not change.

### 15.19.1 Solids density determination



This function calculates material density basing on its weight in air and in water using the formula below:

$$\rho = \frac{m_1}{m_1 - m_2} * \rho_L$$

where,  $m_1$  – weigh in air  
 $m_2$  – weight in water  
 $\rho_L$  – density of liquid

If distilled water is used, enter its exact temperature (accurate to 0,5°C) – the balance will calculate its density automatically.

To enter the value use the following keys:

- ▼ - digit increase,
- ↩ - decimal point,
- T← - next digit,
- MENU - end.

When using liquid other than distilled water, choose OTHER (instead of H2O) option and enter its density according to its temperature.

Phase I: measurement in air.

Phase II: measurement in liquid.

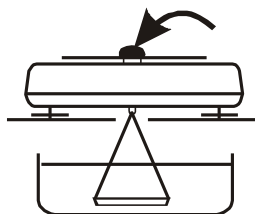
To print measurement result and begin next measurement press **↩** key.



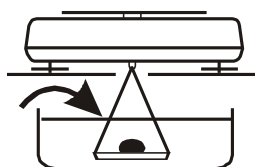
To print a density determination report after all necessary measurements, connect a printer to the balance and press P key. A sample for solid mass density determination is shown below:

Date: ...	Time ...
MEASUREMENT NO.	= ...
WEIGHT in air	= ... g
WEIGHT in a liquid	= ... g
DENSITY	= ... g/cm <sup>3</sup>
Liquid density	= ... g/cm <sup>3</sup>
Liquid temperature	= ... °C

Operation sequence (weighing in air and in liquid) for below-balance weighing:

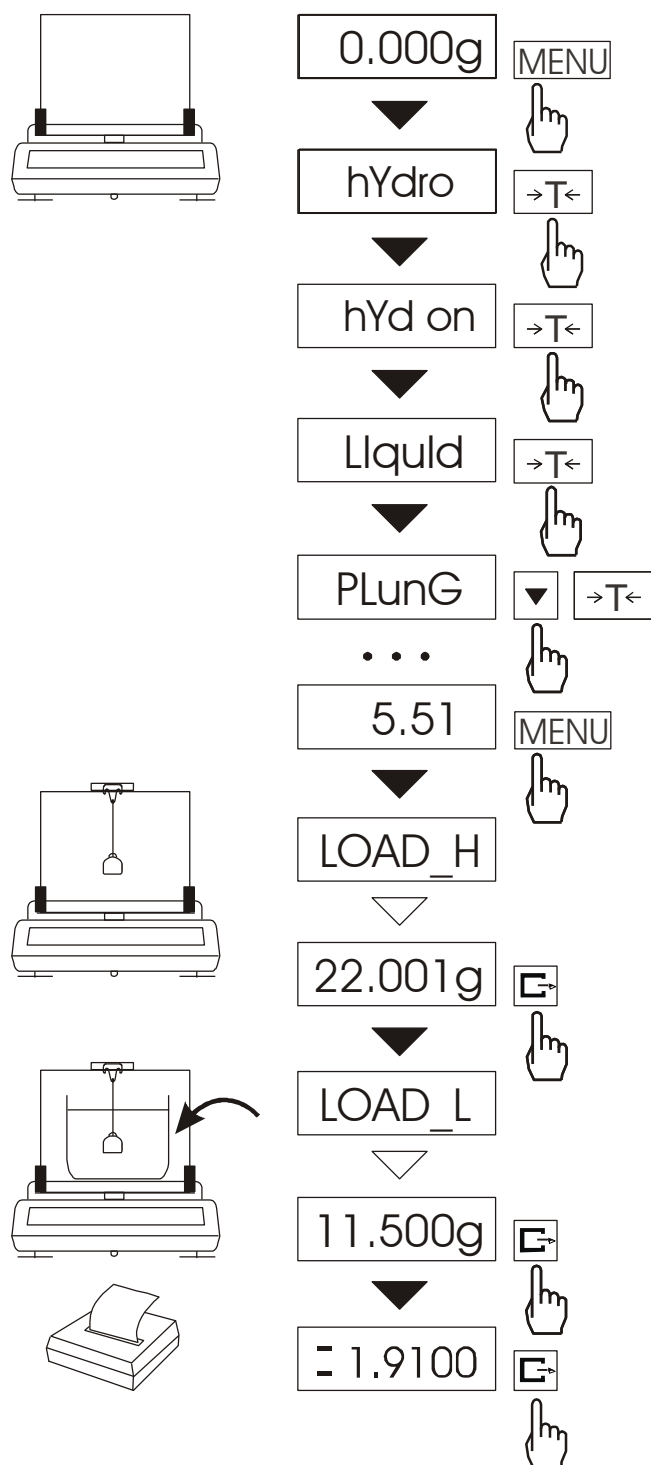


Phase I: measurement in air.



Phase II: measurement in liquid.

### 15.19.2 Liquid density determination



This function determines liquid density basing on plunger weight in air and in examined liquid with known volume, using the formula below:

$$\rho = \frac{m_1 - m_2}{V}$$

where

$m_1$  – plunger weight in air

$m_2$  – plunger weigh in a liquid

$V$  – plunger volume

Plunger volume is stored on its hanger.


To enter the value use the following keys:

- ▼ - digit increase,
- ↩ - decimal point,
- T← - next digit,
- MENU** - end.

Phase I: measurement in air.

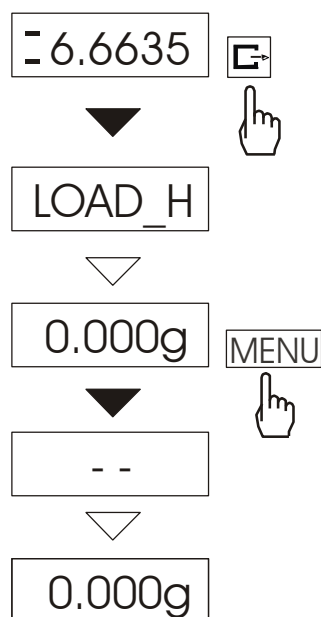
Phase II: measurement in liquid.

To print measurement result and begin next measurement press **↩** key.

To print a density determination report after all necessary measurements, connect a printer to the balance and press  key. A sample for liquid density determination is shown below:

Date: ...	Time ...
MEASUREMENT NO.	= ...
WEIGHT in air	= ... g
WEIGHT in a liquid	= ... g
LIQUID DENSITY	= ... g/cm <sup>3</sup>
PLUNGER VOLUME	= ... g/cm <sup>3</sup>

### 15.19.3 Leaving the function

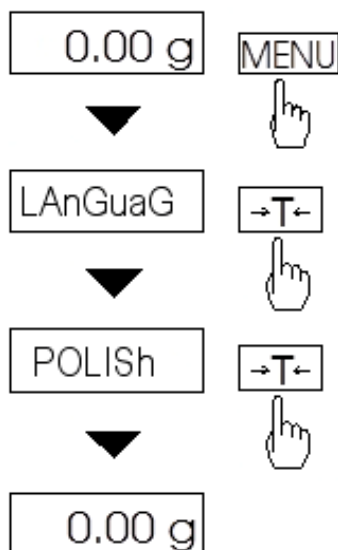


To stop using the function, follow operation sequence as shown on the picture.

In other case the balance begins next density measurement.

## 15.20 Printout language selection (LAnGUAG)

*LAnGUAG* function enables to select printouts language (calibration reports, *total* printouts and *hYdro*).



Press MENU key.

When *LAnGUAG* function appears press  $\rightarrow T \leftarrow$  key.

On the screen will succesively appear:

- *POLISH* ,
- *ENGLISH*,
- *GErMAN*,
- *rUSSIAN*,
- *UkrAIIn* ,
- *CZECH*,
- *SPAnISH*,
- *out*.

Choose the proper language and press  $\rightarrow T \leftarrow$  while it's displaying.

Example of printouts in polish and English language:

- calibration report

**RAPORT Z KALIBRACJI**  
**NUMER FABRYCZNY**  
**NUMER PROGRAMU**  
**MASA KALIBRACYJNA PIERWOTNA**  
**MASA KALIBRACYJNA**  
**RÓŻNICA MAS**

**CALIBRATION REPORT**  
**FACTORY NUMBER**  
**PROGRAM NUMBER**  
**CALIBRATION PRIMARY MASS**  
**CALIBRATION MASS**  
**DIFFERENCE MASS**

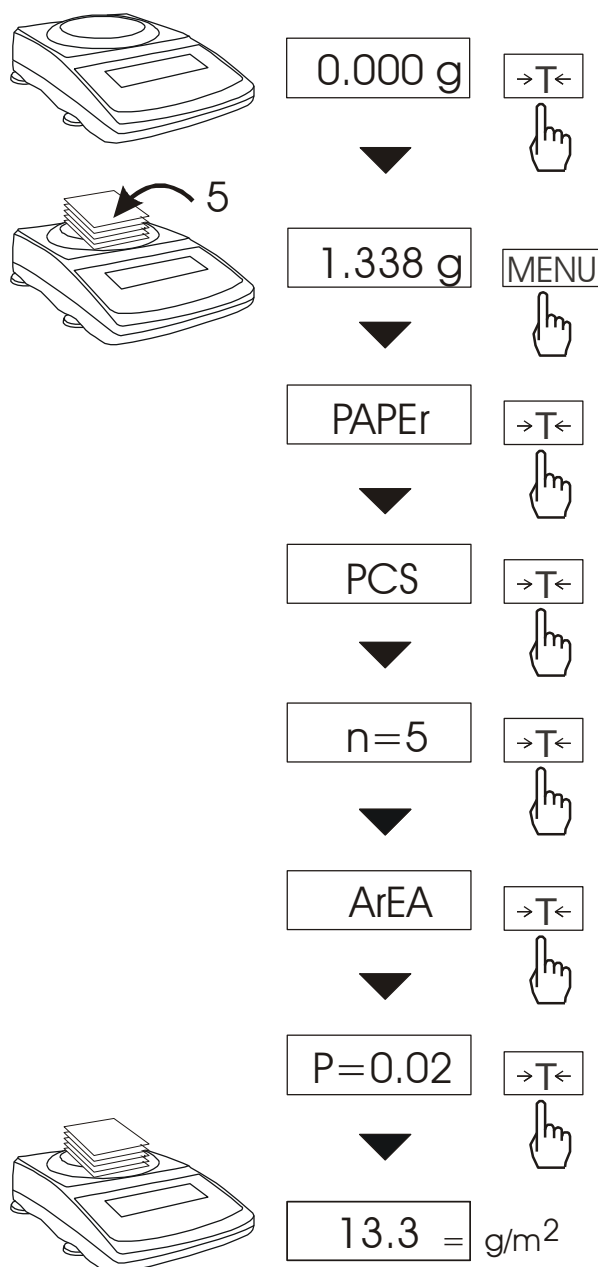
- **total** function report

**UWAGA ! WYZEROWANIE REJESTRÓW**  
**stan przed wyzerowaniem**  
**TOTAL**  
**WARTOŚĆ ŚREDNIA**  
**LICZBA NAWAŻEK**  
**PRZEKROCZENIE ZAKRESU**

**WARNING! ZEROING REGISTER**  
**results before zeroing**  
**TOTAL**  
**AVERAGE VALUE**  
**NUMBER OF MEAS**  
**RANGE EXCESS**

## 15.21 Paperweight calculation (PAPeR)

This function enables to calculate paperweight of  $1\text{m}^2$  of paper basing on samples of known area. For quick access, the function is accessible directly by pressing ↺ key.



The balance must be tared just before the measurement.

Place the specific sample quantity of the same area (possible values: 1, 2, 5, 10, 20, 50, 100).

Press **MENU** key to access Function Menu. To enter the function press **→T←** key when "PAPeR" is displayed.

**PCS** is the number of samples placed on the pan. To choose previously used value, select *old* option.

"**ArEA**" is the area of a single sample. It is possible to choose standard values (0,02 or 0,1g/m<sup>2</sup>) or enter specific value ("A" option).

To enter the value use the following keys:

- ▼ - digit increase,
- ⇐ - decimal point,
- T← - next digit,
- MENU** - end.

The result of paperweight measurement is finished with "=" mark pointing g/m<sup>2</sup> unit.

The balance is ready for the next measurements.

↺ key causes passage to mass measurement and enables next samples (with other quantity and surface of a single sample) measurement start.

## 15.22 Statistical calculations function (StAt)

**Attention:** Function is available on demand and it replaces other special functions.

This function evaluates from series of measurements (max 500) statistical parameters of weighting process. Adding successively measurements to register is automatic and it occurs after the scale is loaded and its indications stabilize.

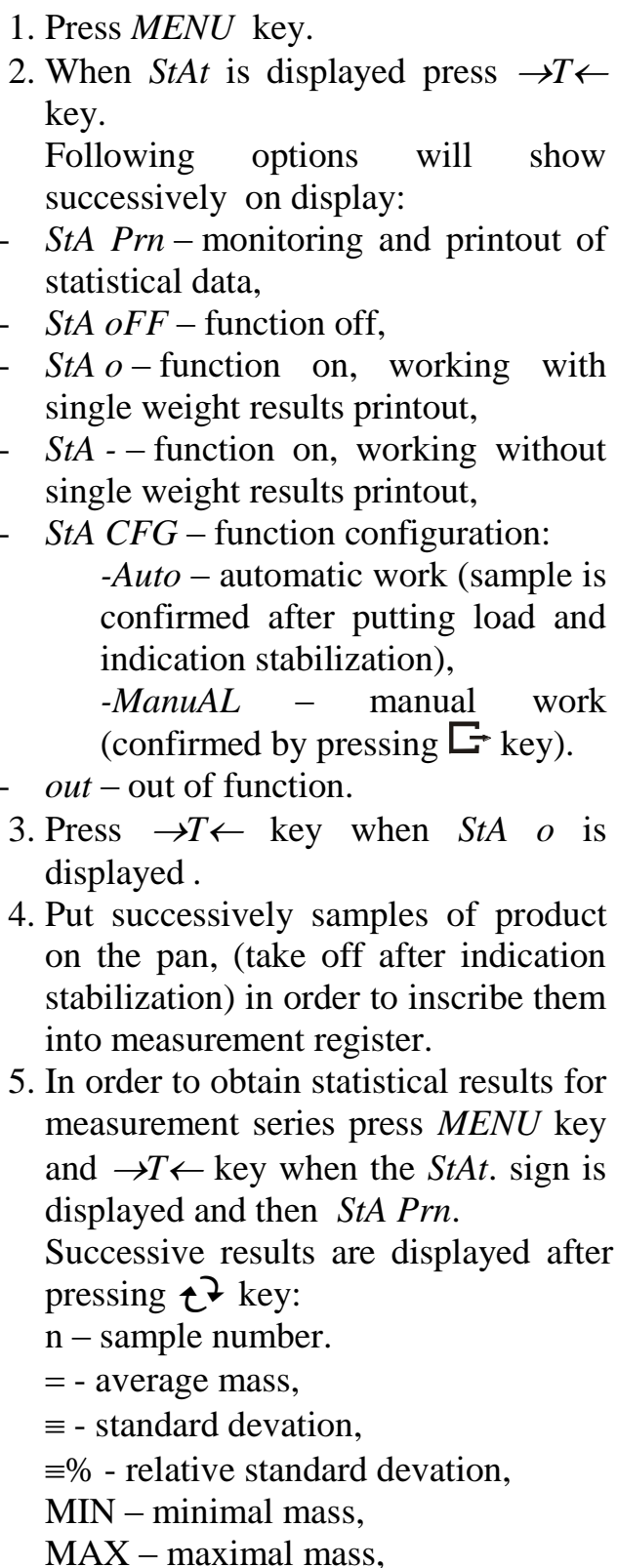
After each loading printout is made with: number of measurements, result, date and time.

Next measurement is made after taking off earlier load.

For the obtained measurements series the scale evaluates:

- n                                      - number of samples
- sum x                                - sum of all samples     $sum\_x = \sum x_n$
- $\bar{x}$                                       -average value (sum x)/n
- min                                    -minimal value from n samples
- max                                    -maximal value from n samples
- max-min                              -maximal value minus minima value
- S                                        -standard deviation     $S = \sqrt{\frac{1}{(n-1)} \sum_n (x_n - \bar{x})^2}$
- srel                                    -variance factor         $srel = \frac{S}{x}$

Statistical calculations results can be printed.



After pressing  $\rightarrow T \leftarrow$  key during *StA End* displayed, user can end displaying statistics.

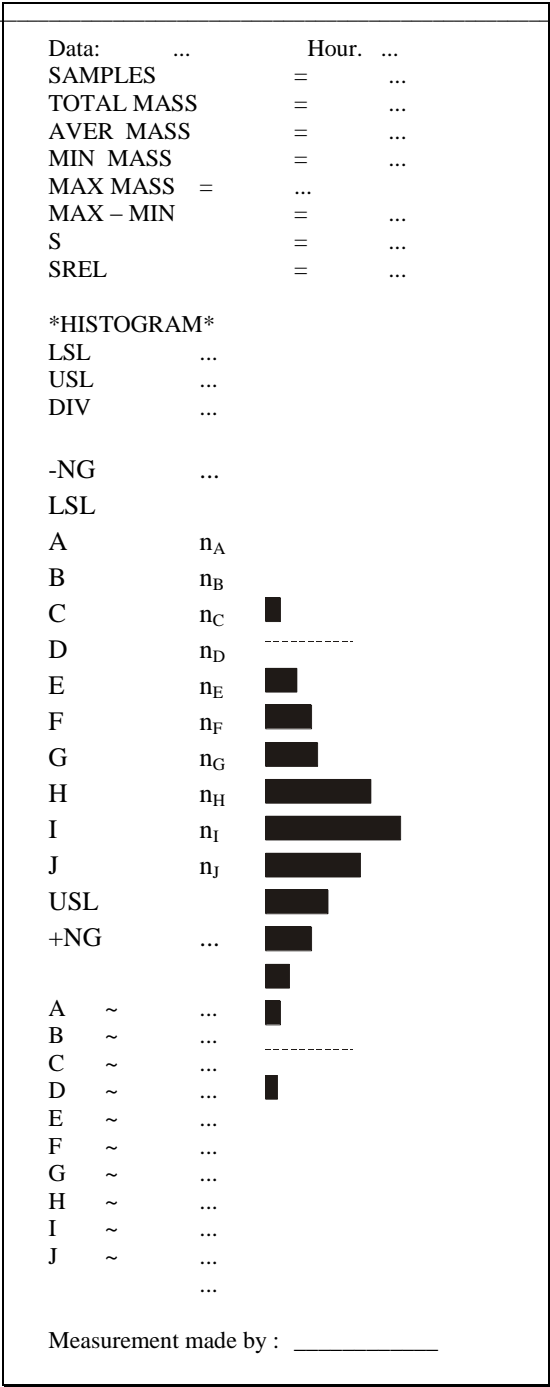
This will cause printout of calculated statistics and histogram :

LSL - allowable lower value,  
USL - allowable upper value,  
A, B, C, .. – measurement intervals,  
n<sub>A</sub> ... – amount of measurements in A interval;  
measurement is in A interval if it is bigger or equal to A interval threshold and smaller than B interval threshold.  
n<sub>B</sub> ... - amount of measurements in B interval;  
measurement is in B interval if it is bigger or equal to B interval threshold and smaller than C interval threshold.

Thresholds are printed under histogram.

-NG - amount of measurements under allowable lower value  
+NG - amount of measurements above allowable upper value

To finish work with this function and zeroing result register press *F* key, then during "*StAt*" and "*F.*" is displayed, press *→T←* key. This will cause printing message about register zeroing.






## 16. Troubleshooting and maintenance

1. The balance should be kept clean.
2. Take care that no dirt is between the casing and the pan. If a dirt is noticed, take off the pan (lift it up), clean a dirt and then mount the pan.
3. In case of improper operation caused by a short-lasting lack of power supply, switch the balance off by unplugging it from the mains, and then after several seconds switch it on.
4. All repairs of the balance should be performed by authorised service centre.
5. To repair a balance, please contact nearest service centre. The list of authorised service centres is given in guarantee card.
6. 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 guarantee.

### Failure messages:

Message	Possible cause	Recommendation
<i>C-1 ... 6</i> (more than 1 min.)	negative result in one of autotests	if message still remains, contact service centre
<i>L</i>	no pan on the balance	put the pan on
	mechanical damage	contact service centre
<i>H</i>	overweight of the balance	take a load off the pan
	mechanical damage	contact service centre
<i>Err-b</i>	load left on the pan	take a load off the pan
 indicator does not work	unstable balance position, ground vibration, air flows	locate the balance in place where stable results are maintained
	damage of the balance	contact service centre
- - - - -	taring not finished	contact service centre
<i>Pr-on</i>	Calibration switch is in ON position or switch is damaged	Change switch position into OFF or contact authorised service

## Declaration of Conformity

We:

**AXIS** Spółka z o.o. 80-125 Gdańsk, ul. Kartuska 375B

confirm with all responsibility that scales:

AG100(C), AG200(C), AG300(C), AG500(C),  
AG600(C), AG1000(C), AG2000(C), AG3000(C), AG4000(C),  
AGZ100(C), AGZ200(C), AGZ300(C), AGZ500(C),  
AGZ600(C), AGZ1000(C), AGZ2000(C), AGZ3000(C), AGZ4000(C), AGZ10C

marked with CE mark comply with the following:

1. EN 55022:2000 Electromagnetic compatibility (EMC) – information technology equipment – Radio disturbance characteristics - standard Limits and methods of measurement and IEC 61000-4-3 - Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test harmonized with the directive 2004/108/WE (Electromagnetic compatibility).

Moreover scales with the following markings on the name plate:

- the number of the Notified Body responsible for EC verification
- two-digit number of the year of EC verification
- a green metrology sticker with "M" mark
- a protective seal affixed by the Notified Body

comply with the requirements on the Type-Approval Certificate No. TCM 128/07-4511 and are verified to comply with:

2. EN 45501 norm Metrological aspects of non-automatic weighing instruments and with 2009/23/WE directive.

Additional information

- Conformity evaluation for the Council Directive 89/336/EEC (replaced by 2004/108/WE) was carried out by Laboratorium Badawcze Oddziału Instytutu Elektrotechniki in Gdańsk, accredited by PCA,
- Type-Approval Certificate No. TCM 128/06-4428 was issued by Český Metrologický Institut Brno (Notified Body No. 1383).

Per pro Director of AXIS Sp. z o.o.:

Production Manager

Jan Kończak



Date: 25-04-2012

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***NOTES***