USER MANUAL

ACN/G serie

File: 2026-02-24 APN_G_gb

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1. General description

APN/G series balances are designed for laboratory work requiring the highest accuracy. The balance's have a graphic display and an internal calibration system that ensures control of the balance's accuracy during operation. The balance's electronic system is based on a new generation 32-bit microprocessor.

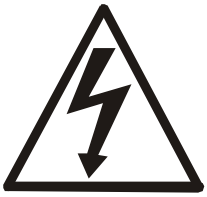
Thank to *the Speed* option , it is possible to change the weighing speed, which allows for better adaptation to the measurement conditions. In particular, when *the Speed / High setting is selected* , the balance can be used to weigh very small portions of mass.

All balances are metrologically checked. According to the order, the balances can be calibrated or EC verified.

2. Set

The basic set includes:
1. Balance,
2. Pan,
3. The ring surrounding the pan,
4. Metal floor of the weighing chamber,
5. Power supply 12V / 1A,
6. User manual,
7. Guarantee.

3. Safety rules



It is necessary to carefully read the safety rules for working with the balance presented below, compliance with which is necessary to avoid electric shock and damage to the balance or devices connected to it.

- Repairs and necessary adjustments to the balance may only be performed by qualified personnel.
- To avoid the risk of fire, only the correct type of power supply should be used (the power supply is supplied with the balance) and the supply voltage must comply with the technical data.
- Do not use the balance with part of the housing removed.
- Do not use the balance in an explosive atmosphere.
- Do not use the balance in places with high humidity.
- If you suspect damage to the balance, turn it off and do not use it until it is checked by a specialized service.

APN/G series balances are not intended for household use.

In accordance with applicable environmental protection regulations, used balances should not be placed in containers with ordinary waste.

- After the period of use, the used balance can be handed over to entities authorized to collect used electronic equipment or to the place of purchase.

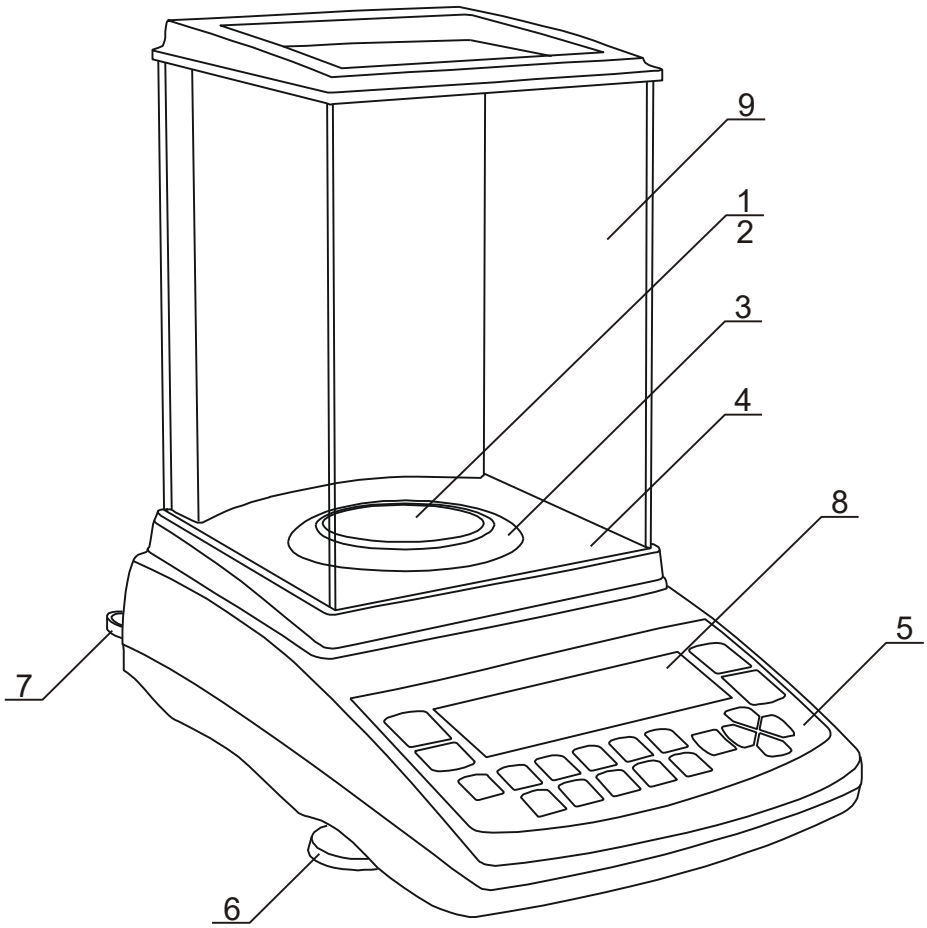
4. Technical data

Technical data				
Balances with int. calib. / **Balances without int. calib.**	**APN120G** / **APE120G**	**APN220G** / **APE220G**	**APN320G** / **APE320G**	**APN220/82G**
Capacity (Max)	120g	220g	320g	82g/220g
Reading unit (d)	0,1mg	0,1mg	0,1mg	0,01mg/0,1mg
Verification unit (e)	1mg	1mg	1mg	1mg
Tare range	-120g	-220g	-320g	-220g
Accuracy class	I			I
Repeatibility [Max]	0,1mg			0,1mg
Repeatibilty [50g]	-			0,03mg
Linearity	±0,2mg			±0,1mg/±0,2mg
Working temperature	+18 ÷ +38°C			
Weighing time	<5s			
Pan size	ϕ90mm			special ϕ90mm
Display	graphical 128x35mm			
Dimensions (with legs)	234x345x356mm			
Draft shield dim.	174x135x220mm			
Interfaces	RS232, USB-B, USB-A, LAN, clock options: Wi-Fi			
Units	mg, g, ct, lb, oz, ozt, gr, dwt			
Languages	ENG, PL, DE, ESP, FRA, IT, CZ, RUS, UA			
Power supply	~230V 50Hz 6VA / =12V 1,2A			
Balance weight	5,2kg			5,3kg
Recommended std. of mass	E2 100g	E2 200g		

Balances with verification option M

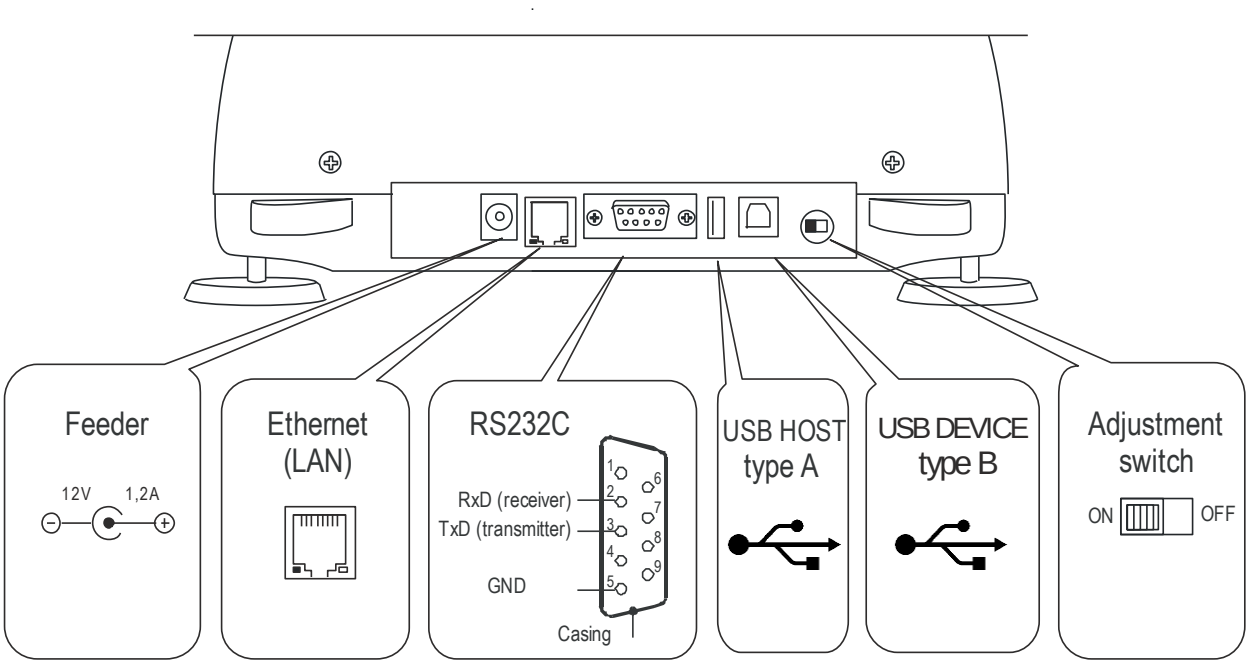
Attention:
E2 - this is the international designation of the class of mass standards according to OIML. The class involves requirements regarding the accuracy of the standards.

5. General view of the balance

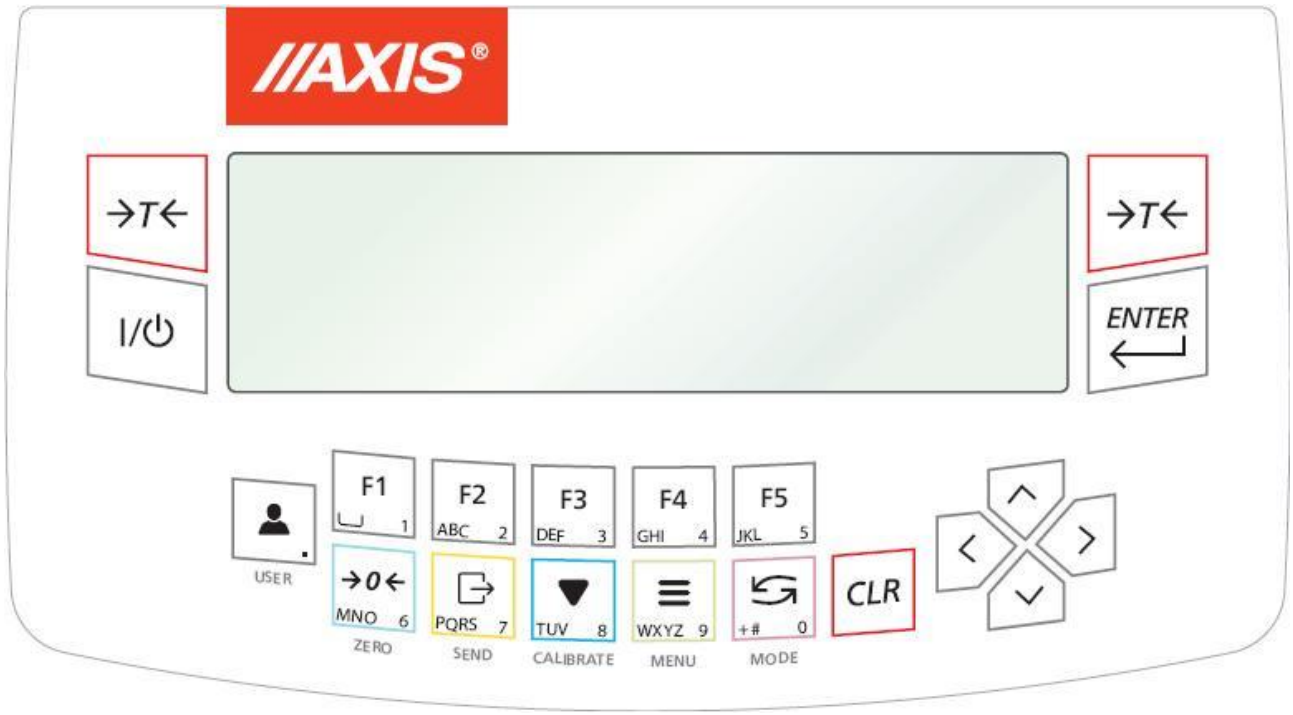


1 – pan
2 – supporting pan (located under the cover)
3 – ring surrounding the pan
4 – floor of the weighing chamber
5 – balance keys
6 – swivel legs
7 – spirit level
8 – graphic display
9 – weighing chamber

Connector view:



6. Weight keys and indicators



Basic key functions

→T←	-	taring (entering the mass subtracted from the weighed mass),
→0←	-	zeroing (option),
ENTER	-	confirming/selecting options,
/ .	-	user login / decimal point,
F1/1...F5/5	-	programmable application shortcuts / digital keys,
→0/6←	-	zeroing (only balances for direct settlements) / digital key (ZERO),
/ 7	-	printout (transmission) of the result / long press displays the printout menu / digital key (SEND),
/ 8	-	internal calibration / digital key (CALIBRATE),
/ 9	-	entry to the menu / digital key (MENU),
/0	-	switching the balance operation mode / digital key (MODE),
∧ < > ∨	-	navigation keys,
CLR	-	undoing the last operation,
I / ⏻	-	on/off switch (standby),

Note: The CLR key is also used to interrupt auto-calibration.

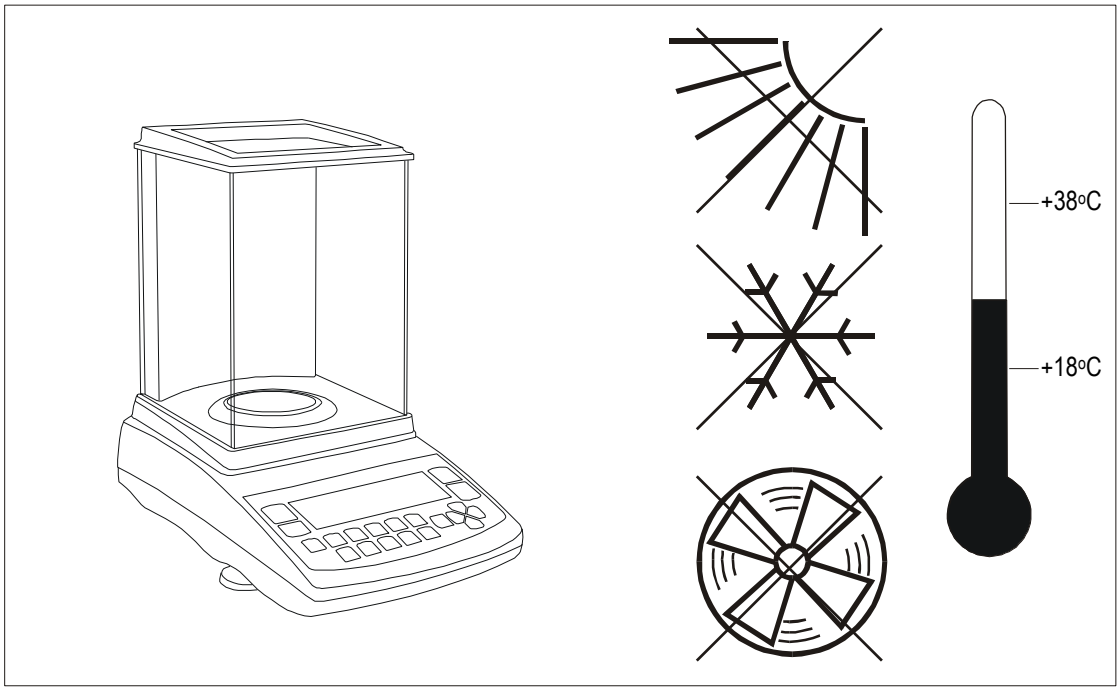
Extended functions of digital keys when entering data

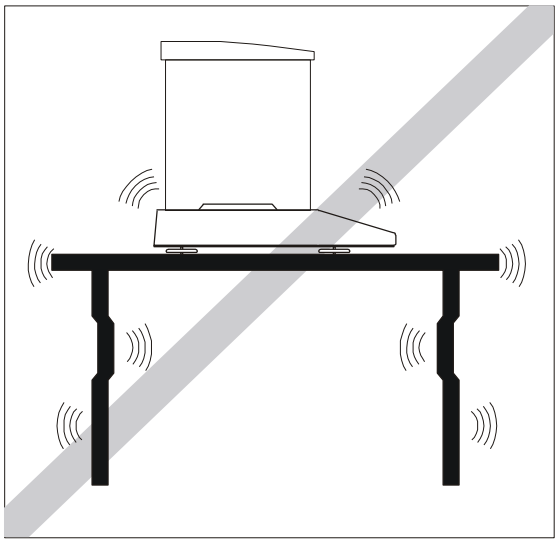
1	1 _ (space between words)
2	2 ABC abc
3	3 DEF def
4	4 GHI ghee
5	5 JKL jkl
6	6 MNO multiplier
7	7 PQ RS pqrs
8	8 STUV stuv
9	9 WXYZ wxyz
0	0 . , ' ? ! " – ( ) @ / : _ ; + & % * = < > $ { } { } \ ~#

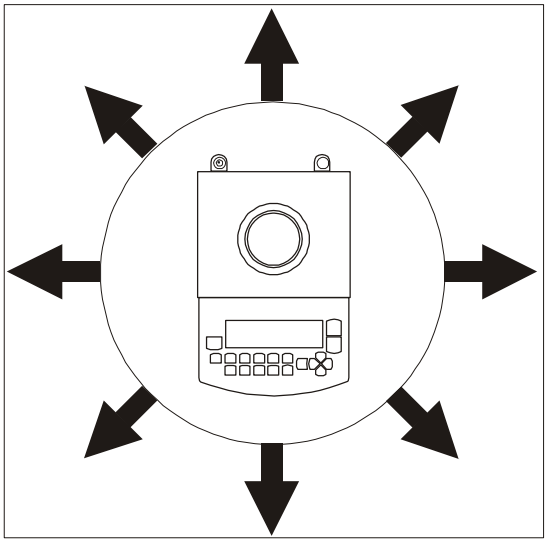
When you select a menu option that requires data entry, a blinking cursor appears. Selecting the appropriate character is achieved by pressing the numeric key several times. The list of characters shown in the upper display bar shortens and the first character from the left is placed in the place indicated by the cursor.
< key , deleting the entire line – *CLR* key .

Extending the functions of the digital keys requires selecting mode 1 when configuring the keyboard (chapter 15.11 Keyboard options).

7. Preparing the balance's workplace

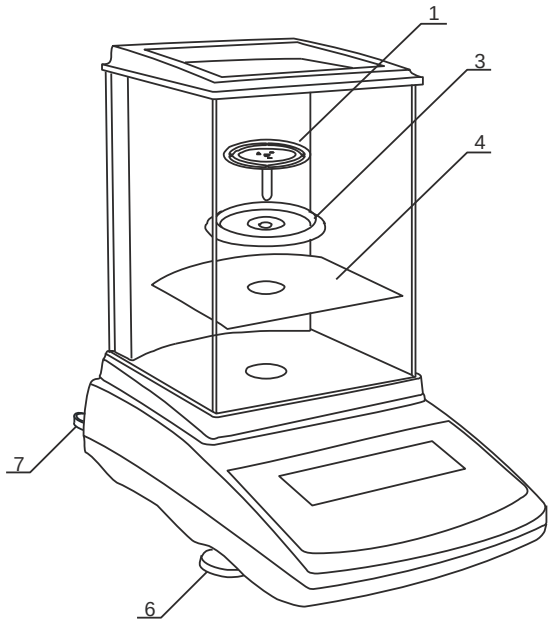






The place of operation of the balance should be selected carefully in order to limit the influence of factors that may disturb the operation of the balance. This place must ensure the appropriate operating temperature of the balance and the necessary space for its operation. The balance should be placed on a stable table made of a material that does not magnetically affect the balance.
Sudden air movements, vibrations, dust, sudden temperature changes or air humidity exceeding 75% are unacceptable. The balance should be away from heat sources and devices emitting strong electromagnetic radiation or magnetic fields.

8. Preparing the balance for work



1. Remove the balance, power supply and mechanical elements of the weighing pan from the box. It is recommended to keep the original packaging for future transport.
2. Place the balance on a stable surface in a place not exposed to mechanical vibrations and air movements.
3. Adjust the level of the balance using the rotating legs *6* so that the air bubble in the level *7* located at the back of the balance is in the middle position.
4. Place metal floor *4* in weighing chamber.
5. Put ring *3* to protect the pan against impact from the side.
6. Gently insert the pin of the supporting pan *1* into the hole in the balance mechanism.

7. Connect the power supply plug to the 12V socket located on the back of the balance.

If the balance is moved from a lower temperature environment to a higher temperature room, e.g. during winter, condensation may form on the surface of the balance housing. In this case, do not turn on the balance's power supply, as it may cause damage or malfunction. Before turning on the balance, leave it for about 4 hours to acclimatize in the room where the balance will work.

9. General rules for using the balance

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

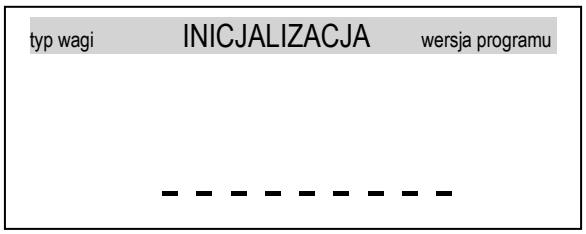
For transportation take off the pan (move it gently and lift it up) and pan support (lift it up) and protect from any damages.

1. Weighed sample should be placed in the centre of the pan.
2. Weighing result should be read when the indicator "◣ ◢" lights, which signalises stabilisation of a result.
3. The balance allows tarring in the whole measuring range. To tare the balance press →*T*← key (on the left or on the right). Tarring 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÷100% Max.
4. In direct sale use (d=e), make sure that →*0*← zero indicator is displayed before sample is placed on the pan. If not, press →*0*←key and wait until the balance is zeroed and zero indicator appears. In other balances the key does not operate.
5. When the balance is not used but should be ready to work immediately, it can be switched off by pressing I/⏻ 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 I/⏻ key.
6. The balance cannot be used to weigh ferromagnetic materials due to decrease of weighing accuracy.
7. Balance mechanism is a precise device sensitive to mechanical shocks and strokes.
8. After every change of balance position, level the balance and perform internal calibration using ▼ key.
9. The balance cannot be used to weigh ferromagnetic materials due to the deterioration of weighing accuracy.

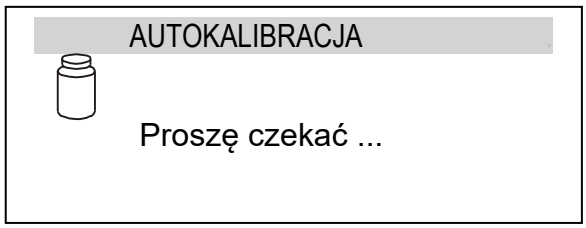
10. Start the balance

Plug the power supply into a 230V socket and insert the power supply plug into the 12V socket located at the back of the balance.

After turning on, the balance displays the AXIS logo and starts self-testing.



If the self-tests fail, their abbreviations are displayed, otherwise the balance starts the zeroing process.



Then the balance automatically switches to the internal calibration mode, described in detail in the next chapter. Calibration can be interrupted by pressing *the CLR key* .

After completing auto-calibration, the balance switches to normal weighing mode.

It is recommended that the internal temperature of the balance stabilizes before starting measurements. For this to happen, the balance must remain on for at least 2 hours. From the point of view of measurement accuracy, continuous operation of the balance is beneficial.

11. Internal calibration

ACN/G scales are equipped with an internal calibration system (ATE/G scales do not have it), the purpose of which is to maintain the required accuracy of the scale under changing operating conditions.

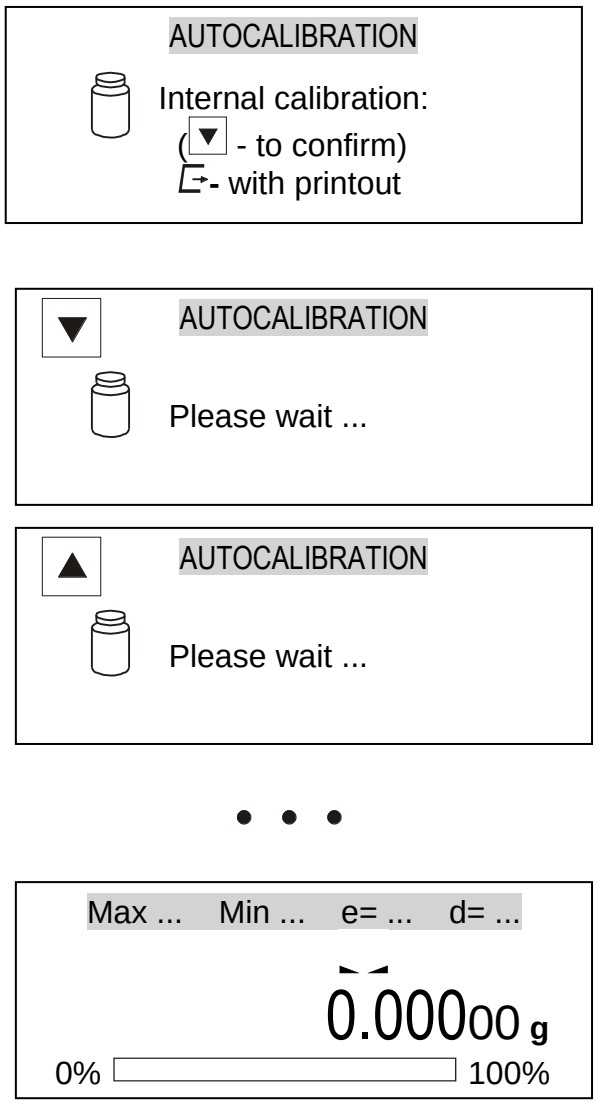
For internal calibration, use the ▼ key (press twice). Calibration should be performed before each series of important measurements, as well as after the flashing *CAL* icon appears .
To interrupt the internal calibration, press the *CLR* key during the calibration , which will display the *CAL End message* and allow you to continue the measurements.

Internal calibration (autocalibration) involves the automatic application of an internal mass standard by the scale mechanism and the introduction of an accuracy correction in the scale's software. This correction is necessary due to differences in the gravitational acceleration between the scale's place of manufacture and its place of operation, as well as changes in the scale's level, temperature, etc.

In the first hour after powering on the scale, internal calibration occurs several times. This is indicated by the message " *Auto calibration in 60 seconds* ," which appears several times within a minute before the internal calibration automatically begins (this process can be shortened by pressing the key twice ▼).

In the following hours, internal calibration occurs after a pre-set operating time and when the ambient temperature changes exceed the pre-set value (for verified scales, this is 2 hours and 2 ˚ C). The moment when internal calibration should be performed is signaled by the *CAL* icon flashing alternately with the stabilization icon . Available calibration options are listed in section 15.3.
In order to perform internal calibration proceed with the following actions:

To perform internal calibration:



Empty the weighing pan.

Press the key ▼ and you will have 2 options to choose from:

- pressing ▼ key again will start the internal calibration (pressing the key twice is to avoid accidental activation of the calibration procedure),
- pressing ⮆ key will turn on the internal calibration with printout (calibration data will be sent to the printer/computer).

During calibration, the internal weight is applied three times and the obtained results are compared. Inconsistency of results is signaled with a message and causes the balance to be blocked.

Do not perform any operations on the balance until the calibration process is completed. Any shocks and vibrations of the balance disturb the calibration process, may extend its duration and deteriorate the accuracy of its result.

Correctly performed internal calibration ends with a zero reading when the weighing pan is empty.

Attention:

To interrupt calibration on non-verified balances, you can press the *CLR key* and wait until the mechanism is set to the home position.

12. Checking the weight

When using the balance, in order to confirm its efficiency, it is recommended to check the weighing accuracy before and after each important series of measurements. This is done by weighing an external mass standard or other object of precisely known mass.
If the permissible weight measurement error is exceeded, check whether:
- the balance is stable and level,
- the balance is not exposed to sudden air movements, vibrations, sudden changes in temperature or air humidity,
-it is not directly affected by a heat source, electromagnetic radiation or magnetic field.
The cause of inaccuracy may also be the cooling of the balance when it is disconnected from the power supply; in such a case, leave the balance switched on for a few minutes to equalize its internal temperature. If none of the above-mentioned causes of inaccuracy occur, the balance should be calibrated with an external mass standard. Recommended external test weight (available at an additional cost) is provided in the technical data table. In verified balances, calibration with an external mass standard involves breaking the seals and requiring repeated verification. In such a case, it is recommended to contact an authorized service center.
A detailed description of calibration with an external mass standard is provided in section 15.3.

13. Connection to external devices

In order to transfer data to/from external devices, the balance can be equipped with the following connectors:

- RS-232C – to a printer, label printer, computer or barcode reader

(HD42A reader recommended) ,

- USB B (USB Device) – to the computer (single-station operation),

- USB A (USB Host) – for a keyboard, pendrive or USB code reader (HID class),

- LAN (option) – to a computer or computer network,

- Wi-Fi (optional) – to a computer or wireless computer network.

When used with a printer, data can be sent after pressing a key ⮆ or automatically after placing a sample and stabilizing the balance readings, with the next transmission possible after removing the sample.

When working with a labeling machine, after pressing a key, ⮆ the balance sends a set of instructions to the labeling machine. The following are sent: label number 0001, time, date (if a clock is installed and turned on), net weight. During transmission, the message *LabEL* is displayed .

When used with a computer, the balance transmits the weighing result following an initial signal from the computer or after pressing a key ⮆ on the balance. The *Axis Balance Manager* program is dedicated to the balance's cooperation with a computer and supports the following connectors: RS-232C, USB B (USB Device) and LAN.

Connecting an external computer keyboard allows you to easily enter text data needed when using special functions.

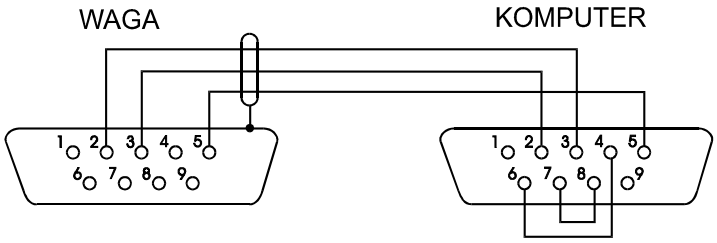
The pendrive is used to save measurement results in a text file with a given name.

The method of sending data and transmission parameters are set using *the Configuration/Interface option* .
The set of data sent is determined using *the Configuration* / *Print option* .

The following data can be sent:
- header (balance type, Max, d, e, serial number),
- operator identification number,
- next printout (measurement) number,
- product identification number or barcode,
- quantity of pieces (regarding the *PCS function*),
- unit weight of the detail (applies to the *PCS function*),
- net weight,
- tare (packaging weight),
- gross weight,
- total mass (applies to the *totAL function*).

For each connector, *the Print function data* is set independently.
If the balance works with a computer, the computer must have a program that allows processing data from the balance. Such programs are available from the balance manufacturer.
The necessary drivers and installation instructions can be found at www.axis.pl.

WK-1 connection cable *(connects the balance to the computer/9-pin connector):*



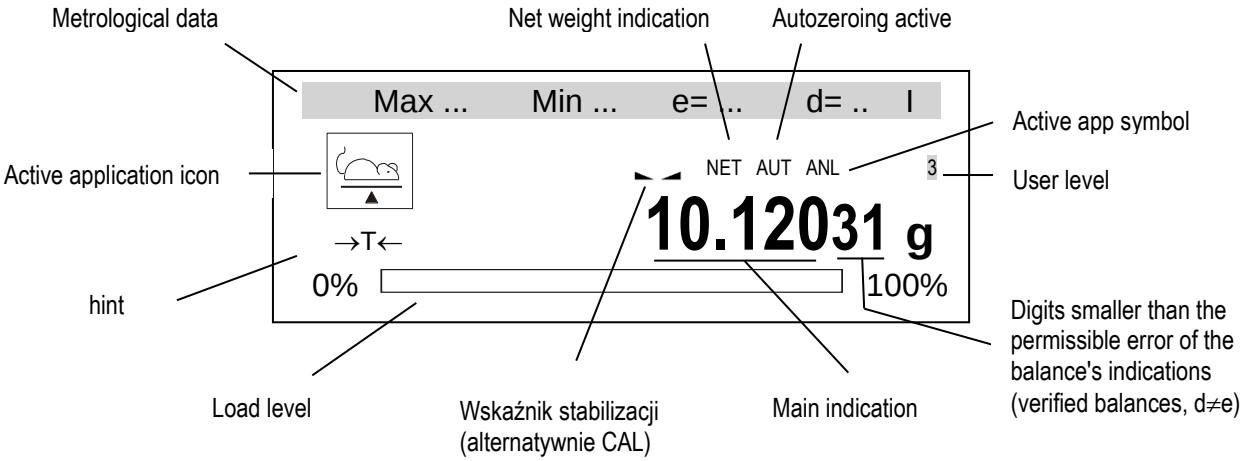
The cable connecting the balance with the printer is included with the printer.

Setting the internal switches of the AXIS printer:

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

14 . Navigation in the balance menu

Balance display during weighing:



After turning off the balance with the I/ key ⏻, the OFF indicator appears .

After pressing *the MENU key* the main menu of the balance appears:

MENU
1. Applications
2. Measurements
3. Configuration
4. Info
5. Exit

Main menu includes:
- *Applications* – the User's own menu (configured by him),
- *Measurements* – option related to ALIBI memory, allows you to view the last 1000 measurements,
- *Configuration* - creating the User's own menu, calibration, setting the balance's options,
- *Info* – information about the balance: model, production date, serial number, firmware and checksum
- *Exit* – exit from the menu

To use or to select an application, move the cursor to it and press ENTER.
The following keys are used to navigate the menu:

∧	-	move the cursor to the option above,
∨	-	move the cursor to the option below,
>	-	entering the option indicated by the cursor, scrolling sub-options to the right
<	-	exit current option, scroll sub-options left
ENTER	-	confirming/selecting options,
CLR	-	exiting the current option (also undoing the last operation, interrupting auto-calibration),
F1, F2, ... , F5	-	shortcut keys for five selected applications,
MENU	-	entering/exiting the menu,
↻	-	active application enabled/disabled,

PERCENTAGE	
1. Activation	
2. Shortcut:	<F1><F2>...<F5>
3. Exit	

A convenient navigation tool are application shortcut keys: F1, F2, ..., F5, assigned in the internal application menu. These keys allow you to directly activate selected applications.

15. Setup

The configuration includes all options for setting the balance's operation method:

MENU

1. Applications
2. Measurements*
3. Setup
3. Info
4. Exit

SETUP

1. User
2. Menu
3. Calibration
4. Auto-zeroing
5. Unit
6. Interface
7. Print setup
8. LCD settings
9. Language
10. Time&date
11. Keyboard
12. Analog output (option)
13. Speed
14. Defaults
15. Service
16. Exit

User – logging in and creating users,

Menu – selection of applications for the User's own menu,

Calibration – calibration of balance sensitivity,

Auto-zeroing – automatic maintenance of the zero indication of an unloaded balance,

Unit – selection of the mass unit

Interface – setting serial ports,

Print – selection of data for transmission (print),

LCD - allows you to set the contrast and backlight of the balance display

Language – menu language selection (Polish, English, German, Spanish, French, Italian, Czech, Russian, Ukrainian)

Date/time – entering the current date and time

Keyboard – options related to buttons

Speed – the speed at which the balance works,

Analog output – configuration of output 4 -20mA (0-10V) – option,

Default – return to factory settings,

Service – service options not available to the User

Exit – return to the main *menu.*

Comments

1. If an attempt is made to use the configuration option without first logging in as the ADMIN User (or another user with such privileges), the following message will appear:

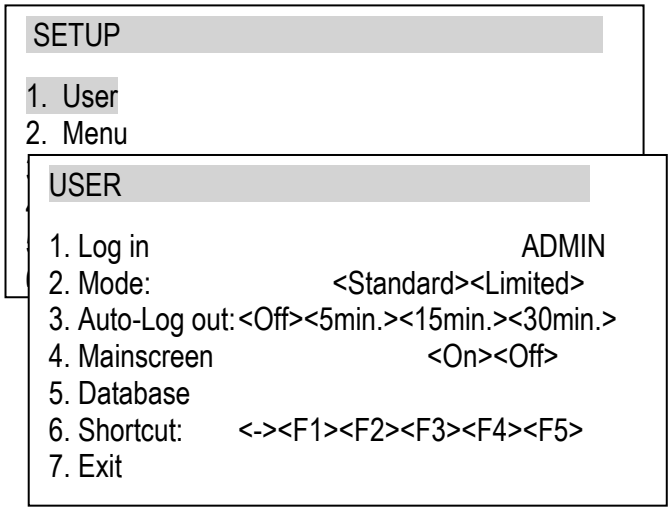
WARNING!

Operation not allowed!

User login is described in the next section.

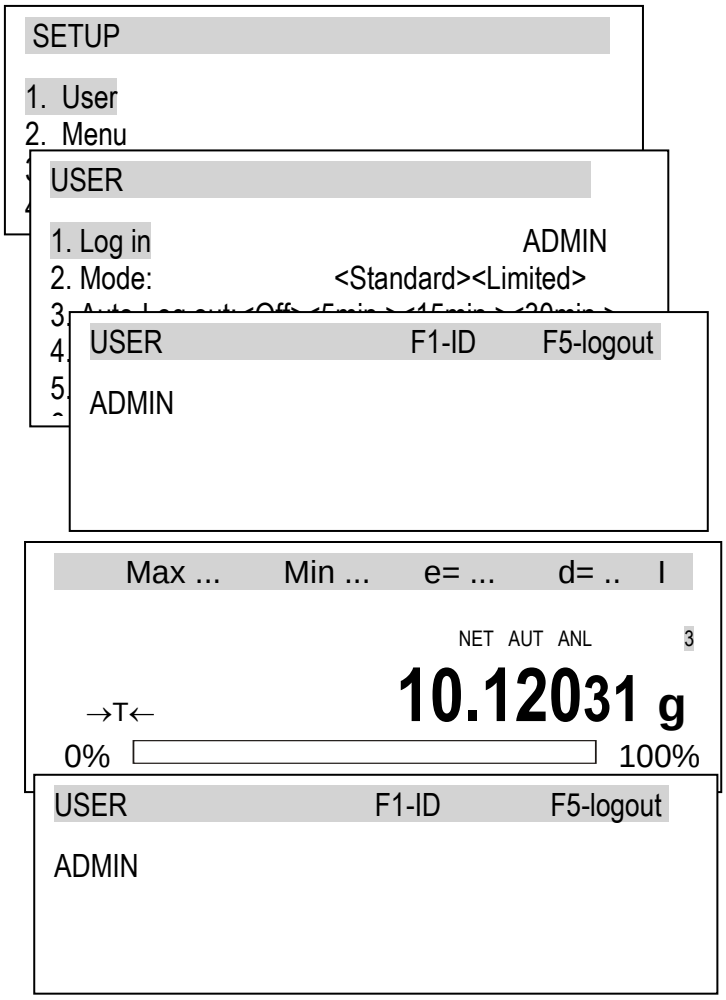
1. Using the default settings option does not change the basic metrological parameters of the balance, such as: sensitivity, linearity (if the position of the adjustment switch is not changed), however, all other settings affecting the operation of the balance and communication with other devices can be changed and require re-setting by the User.

15.1 User – Logging in and adding users



Log in – enter the user list and log in,
Mode – In “standard” mode, each user ID can be selected (entered) and the lowest level (permissions) is automatically assigned. In " Limited " mode only previously defined users can be selected,
Auto-log out – this option allows the user to be automatically logged out if the balance is unused for a selected period of time,
Mainscreen – this option activates information about the user's level (privileges) on the main screen (during weighing),
Database – allows you to add, edit or delete a user,
Shortcut – quick access key, use the navigation keys to select the shortcut key: F1, F2, ... or F5 .

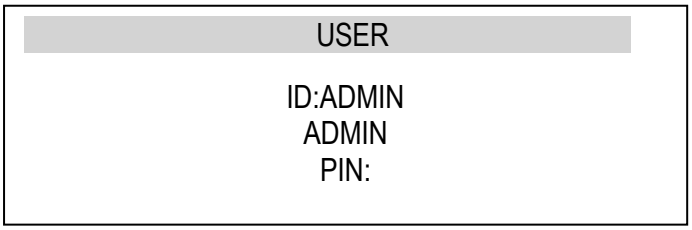
User login



User login is possible after:
- selecting *User* and *Log in,*
or after
- pressing (default shortcut) while displaying the main weighing screen.

The list of users will be displayed on the screen..

Immediate access to login is obtained by pressing the key.



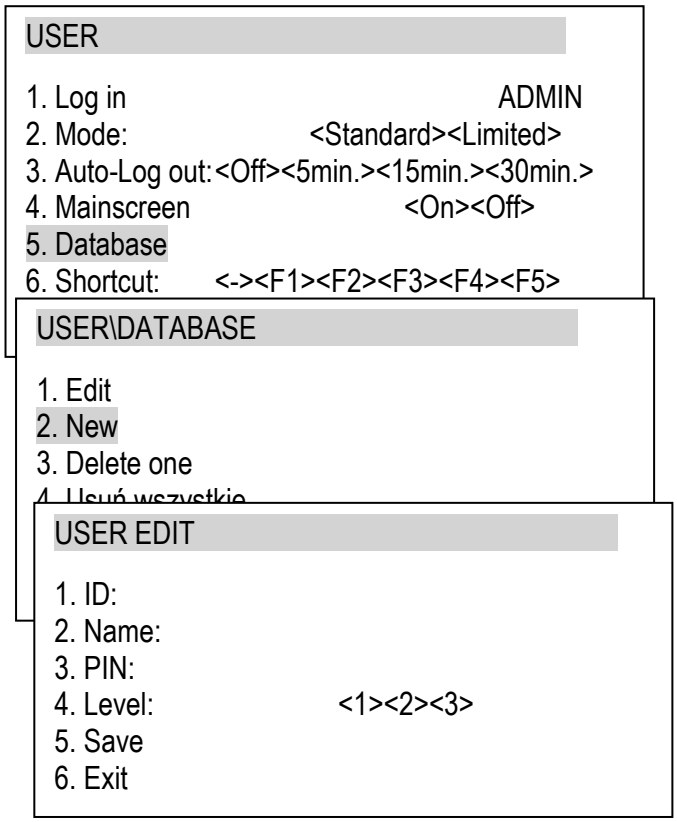
After selecting ADMIN, enter the PIN code.

ATTENTION:

THE USER FUNCTION IS FULLY ACTIVE AFTER ADDING AT LEAST ONE USER WITH THE HIGHEST LEVEL OF AUTHORITY.

ONLY USERS WITH THE HIGHEST LEVEL OF AUTHORITY ("3") HAVE ACCESS TO ALL BALANCE OPTIONS.

User base



The user database allows you to add (*New*), edit or delete users.

After selecting *New* or *Edit* , the user can enter the user ID (max 8 characters), name (max 12 characters), PIN code (max 8 characters) and user level (authorities/priveleges). Finally, select *Save* .

User permissions:

" 1 " - viewing available menus,
- using available active applications,
- changing parameters available in the application that are not saved in non-volatile memory,

" 2 " - permissions as above,
- activating the application,
- changing application parameters that are saved in non-volatile memory,

" 3 " - permissions as above,
- changing balance and user settings in the " 2.Setup " menu.

15.2 Selecting an application - creating a User menu

All balances, apart from the basic metrological functions: weighing and taring, have a number of applications (utility functions) and configuration functions collected in the balance menu.

SETUP

1. User
2. Menu
3. Calibration
4. Auto-zeroing
5. Unit
6. Interface
7. Print setup
8. LCD settings
9. Language
10. Time&date
11. Keyboard
12. Analog output
13. Speed
14. Defaults
15. Service
16. Exit

In order to limit the number of User applications that appear after pressing the Menu key, the User can select the applications that interest him and thus create his own menu.

How to create a User menu:

When turning on the balance for the first time, press the *MENU key and* select *the Menu option* .

A list of applications will appear for you to choose from. A detailed description of all applications can be found in the *Applications chapter* .

Activating the application into the User menu is done by pressing the *ENTER key* when the symbol for a given function is displayed.
Added application is marked with „V" sign.

MENU

- □ Product
- □ PCS
- □ Unit
- □ Percent
- □ (Label)
- □ Animal
- □ Tare setting
- □ MAX/MIN
- □ Newton
- □ Total
- □ Threshold
- □ Stats
- □ Paper
- □ Denisty
- □ Recipe

Exit

Once you have selected all the applications you need, use *Exit* to return to the main menu.

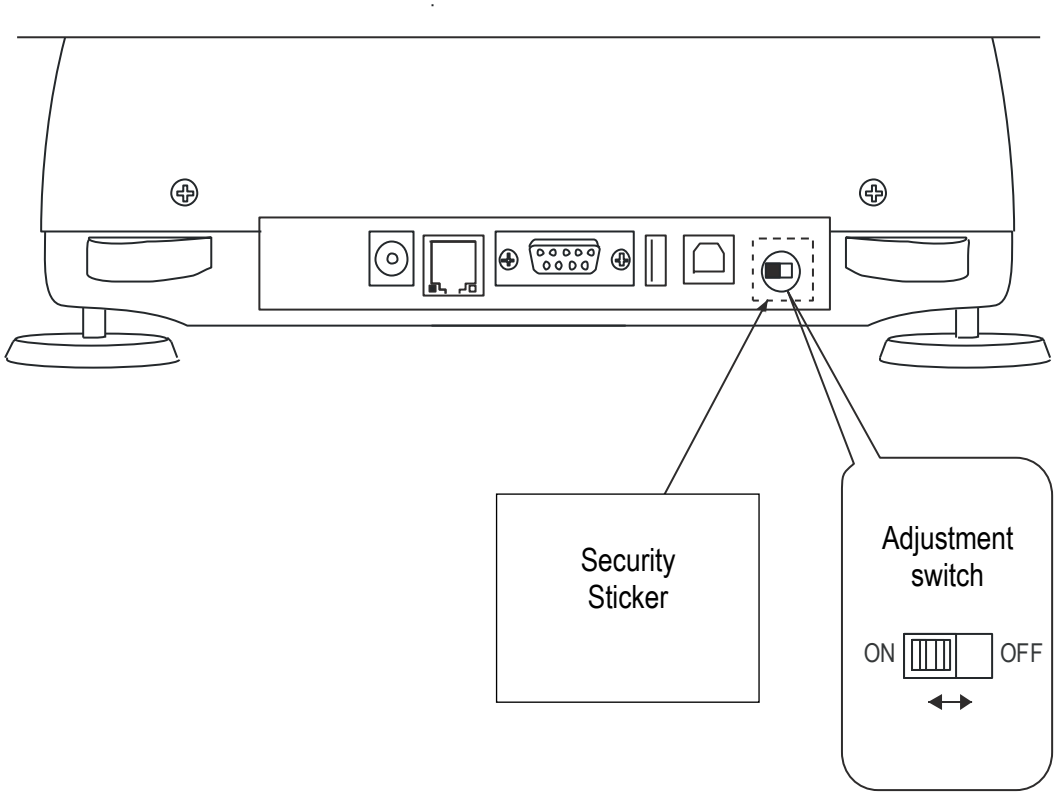
Default option removes all applications from the menu (restores the menu to factory settings).

Note: The *LabEL* function is activated after enabling the data transmission protocol suitable for label printing (*EPL or EPL-A).*

15.3 Calibration with an external mass / calibration options

Calibration with an external mass standard should be performed if the accuracy of the balance is not satisfactory after internal calibration. In such a case, use the mass standard given in the balance's technical data table (or a more accurate one) with a valid calibration certificate.

Calibration of a verified balance requires violating the feature that protects access to the adjustment switch and results in the loss of EC verification. In order to re-legalize, it is necessary to contact the website or the Office of Measures.

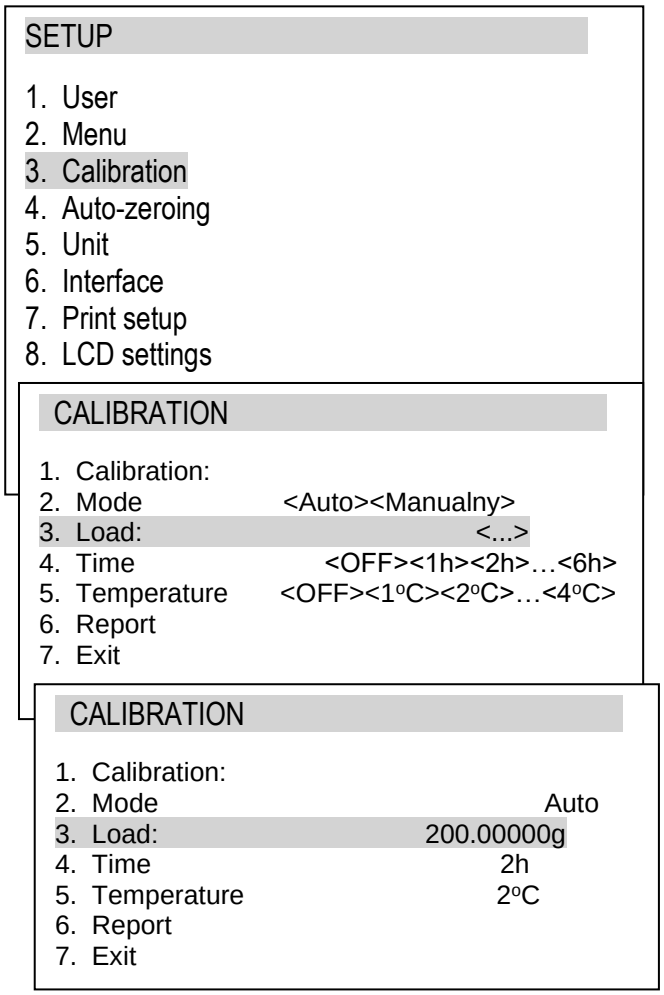


In a verified balance, calibration requires changing the position of the adjustment switch located under the security mark (sticker) of the Office of Weights and Measures. Access to the switch is only possible after removing the sticker. Therefore, calibration of the balance results in the loss of EC verification and, consequently, the need for re-verification at the nearest Office of Measures or at the place where the balance is used.

Before calibrating a legalized balance, use a thin screwdriver to turn the adjustment switch to the *ON position* (the balance will display the message *Switch ON* and an acoustic signal will sound).

After completing the calibration process described on the next page, the balance will display the message *Switch ON* . Using a thin screwdriver, switch the adjustment switch to the *OFF position* (the balance will go to weighing).

To calibrate the balance, use the *MENU key* , select *the Configuration option* and then *Calibration* .

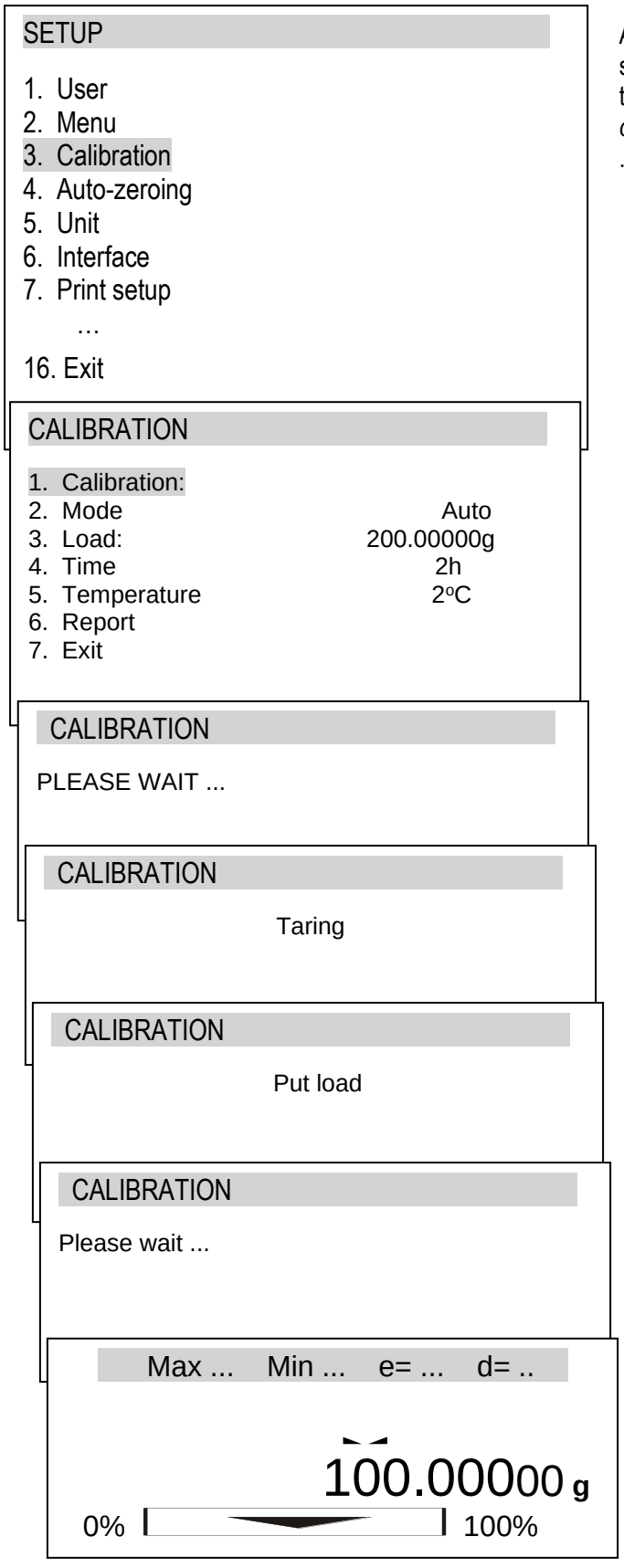


The Mode option should be set to *Auto* (*Manual mode* requires additional confirmation of the load application, use the *ENTER key*).

The Load option allows you to enter the value of the mass standard to be used for calibration, but it is recommended to use the largest possible mass standard.

Time option allows you to set the time interval for internal calibration.

The Temperature option allows you to set the temperature change value at which internal calibration occurs.



After setting the value of the available mass standard, in order to perform calibration, prepare the standard for use, select *the Calibration option with the cursor* and press the *ENTER key* .

Place standard of mass on the pan.

Displaying the standard mass value means that the calibration process has been successfully completed.

With the exception of the *Report option* , calibration options are available after changing the position of the adjustment switch.

Internal calibration options:

Internal calibration always takes place after turning on the scale (regardless of the options set), and can also be performed using a key ▼ or automatically:
- at specified time intervals (for verified scales – obligatory 2 hours),
- when the temperature changes by a given value (for verified scales – obligatory 2 °C).

In non-legally verified scales, the time and temperature values can be changed or turned off completely (the OFF option disables automatic internal calibration; only the key works ▼). When weighing is in progress, the start of internal calibration is delayed, but in legally verified scales, the delay time is limited to a few minutes.

To set the internal calibration option, use the *MENU key* , select *Configuration* , and then *Calibration* .

SETUP

1. User
2. Menu
3. Calibration
4. Auto-zeroing

. . .

16. Exit

CALIBRATION

1. Calibration:
2. Mode: <Auto> <Manual>
3. Load: <…>
4. Time: <OFF> <1h> <2h>… <6h>
5. Temperature: <OFF> <1°C> <2°C> … <4°C>
6. Report
7. Exit

The following internal calibration options will be displayed:
- *Time* - setting the time interval for internal calibration,
- *Temperature* - setting the temperature difference for internal calibration,

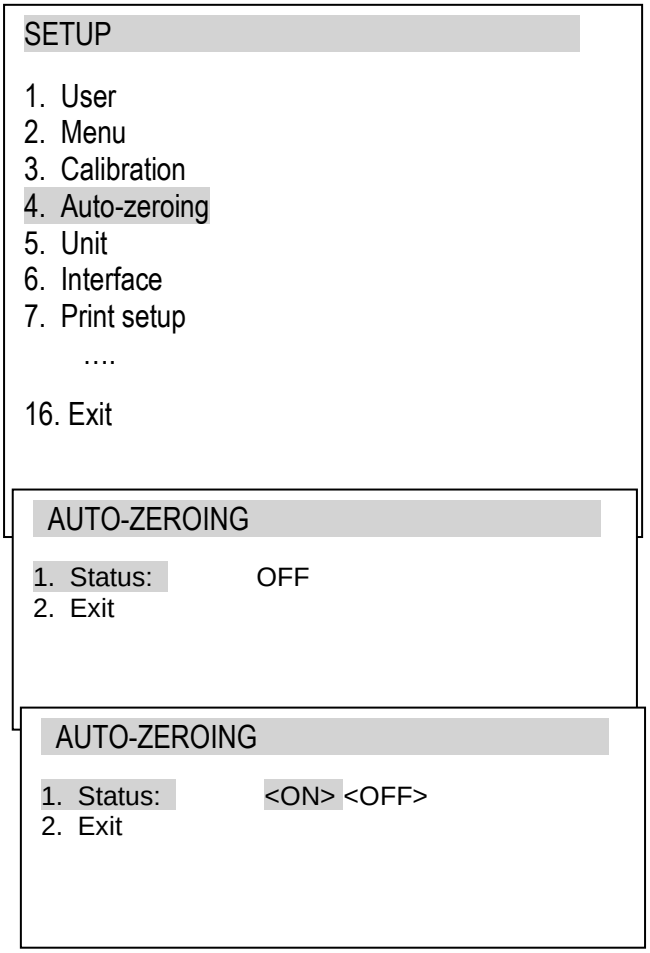
In scales intended for legalisation, the internal calibration options do not appear and the mandatory values are: 2 hours and 2 °C).

Calibration report printout format:

---------- CALIBRATION REPORT ----------
Model … Max … e … d …
S/N : ……..
PROD.DATE: …
FIRM.VER.: …
FACTORY EXT.LOAD : …
FACTORY INT.LOAD : …
CALIBRATION NO. : …
CALIBRATION DATE : …
CALIBRATION TEMP: …
CURRENT EXT.LOAD : …
CURRENT INT.LOAD : …
WEIGHT DIFFERENCE: …

15.4 Auto-zeroing function

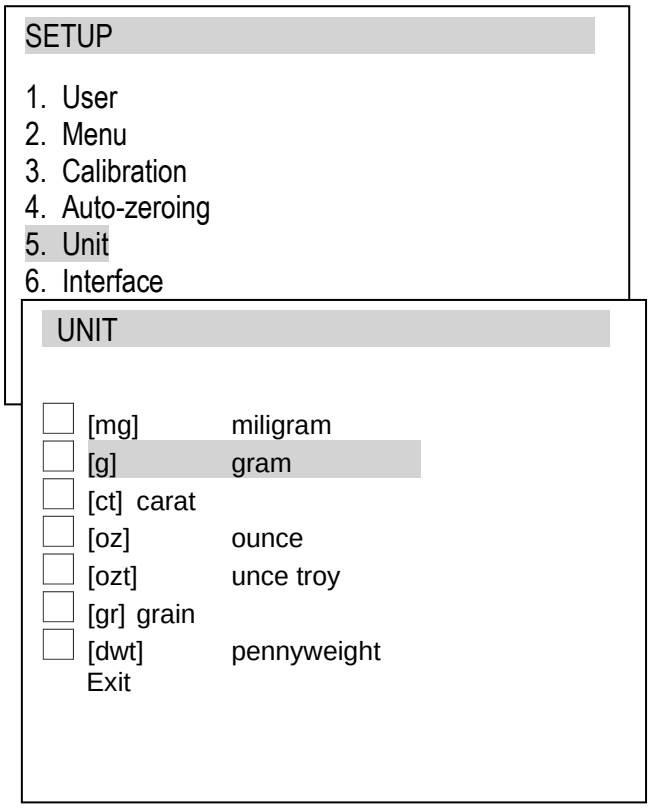
Auto-zeroing special function causes balance indications that differ slightly from zero to be corrected automatically and, with the pan unloaded, zero mass indications will be maintained regardless of changing ambient conditions (temperature, air humidity, etc.).



To enable the *Auto-zero function* , use the navigation keys and the *ENTER key* to select *Status ON* .

15.5 Unit selection

To change the default unit of mass used in the balance, use the *MENU key* , select *the Configuration* and *Units options.*



The following units are available:
grams (g)
milligram (mg)
carat (carat): 1ct=0.2g
pound (English pound): 1lb=453.592374g
grain (gran): 1gr=0.06479891g
ounce: 1oz=28.349523g
ounce troy (pharmacy ounce): 1ozt=31.1034763g
pennyweight (jewelry unit): 1dwt=1.55517384g

Reading accuracy for individual units:

Unit	APN220/82G Readout	Other models Readout
mg	0.01 / 0.1 mg	0.1mg
g	0.00 01 / 0.0001 g	0.0001 g
ct	0.001 / 0.01 ct	0.01 ct
oz	0.0000005 / 0.000005 oz	0.000005 oz
ozt	0.0000005 / 0.000005 oz	0.000005 oz
gr	0.0002 / 0.002 gr	0.002 gr
dwt	0.000 01 / 0.0001 dwt	0.0001 dwt

The unit is selected using the navigation keys and the *ENTER key* . The selected unit remains after power off.

15.6 Configuration of interface parameters

SETUP

1. User
2. Menu
3. Calibration
4. Auto-zeroing
5. Unit
6. Interface
7. Print setup

…

16. Exit

INTERFACE

1. RS-232C
2. USB Device
3. USB Host
4. LAN
5. Wi-Fi
6. Exit

INTERFACE \ RS-232C

1. Sending
2. Protocol
3. Scanner
4. RS addres
5. Settings
6. Defaults
7. Exit

INTERFACE \ RS-232C \ SETTINGS

1. Baudrate:	9600
2. Bits:	8-bit
3. Parity:	none
4. Exit	

The option allows you to set the transmission parameters independently for each port, optionally available as: RS232C, USB B (Device), USB A (Host), LAN or Wi -Fi :

- *Sending* - transmission method:
  Stab – transmission after pressing the ⮆ key and stabilizing the display,
  Auto – automatic transmission after placing and stabilizing the indication (next after removing the goods from the pan), without using the ⮆ key,
  Remove – automatic transmission after removing the goods, without using the ⮆ key,
  Scann – transmission after a signal from the scanner,
  Cont. – continuous transmission of approximately 10 results per second.
- *Protocol* - transmission protocol:
  Long – cooperation with a computer or printer ,
  EPL – cooperation with the label printer in normal mode (activates the *LAbEL function*),
  EPL_A – cooperation with the labeling machine in automatic mode (also activates *LAbEL*),
  EPL_d – cooperation with special labeling machines,
  Pen-01 – cooperation with PEN-01 adapter,
- *Scanner* – scanner operation, waiting for the CR LF suffix and in the case of the RS232C connector, it blocks transmission from the balance to the scanner,
- *RS address (balance number in the network)* - if the balance does not work in a multi-station network, 0 should be entered,
- *Settings* :
  rate (*Baudrate)* : *4800, 9600, 19200,… 115200bps* ,
  number of bits in a byte (*Bits)* : *7, 8* ,
  parity check (*Parity)* :
  none – no control,
  Odd -odd ,
  Even - parity,
- *Default* - parameters set at the factory: *9600 bps, 8 bits, nonE* , *Stab, Long*

INTERFACE

1. RS-232C
2. USB Device
3. USB Host
4. LAN
5. Wi-Fi
6. Exit

USB HOST

1. Sending
2. Protocol
3. Scanner
4. Settings
5. Defaults
6. Exit

the USB Host port (USB-A) includes: transmission method (*Sending*), *Protocol* and, in *Settings* , the name of the file on the pendrive.

INTERFACE

1. RS-232C
2. USB Device
3. USB Host
4. LAN
5. Wi-Fi
6. Exit

LAN

1. Sending
2. Protocol
3. Scanner
4. RS address
5. Settings
6. Defaults
8. Exit

LAN \ SETTINGS

1.	DHCP:	on
2.	IP:	255 255 255 255
3.	GATEWAY:	255 255 255 255
4.	MASK:	255 255 255 255
5.	MODE:	<Serwer><Client>
6.	REMOTE IP:	
7.	PORT:	1001
8.	SAVE	
9.	Exit	

Configuring the LAN port requires entering the Client or Server mode.

In Server mode, any computer (in the corresponding subnet) can connect to the balance. REMOTE IP is then not entered.

In Client mode, it is required to enter the REMOTE IP address - server/computer that can connect to the balance,

Setting DCHP to ON automatically selects IP, Gateway and Mask.

The recommended port number is 1001.

15.7 Print configuration

SETUP

1. User
2. Menu
3. Calibration
4. Auto-zeroing
5. Unit
6. Interface
7. Printout
8. LCD settings
9. Language

…

16. Exit

Function is used for printing additional information stored in balance memory, weighed product identification data and balance operator id. That information is inscribed using balance keys or scanner After selecting the *Print option* , the following options are available (note: the number of ports may vary depending on the balance's equipment):

- *RS232C* – print configuration for RS232C,
- *USB Device* – print configuration for USB (USB B),
- *USB Host* – print configuration for USB host (USB A),
- LAN – print configuration for Ethernet,
- *Print number reset* – resetting the measurement number (the current number in memory is shown next to it),
- *Print number save* - after the balance is turned off, the measurement number is saved in memory.

PRINTOUT

1. RS-232C
2. USB Device
3. USB Host
4. LAN
5. Print number reset: 0
6. Print number save: off
7. Exit

After selecting one of the ports, the user has the following options:

- *Auto-header* – option to automatically print the header when the measurement number is 0,
- *Header* – selection of fields printed in the header,
- *Values* - selection of fields printed between the header and footer,
- *Footer* – selection of fields printed in the footer,
- *Field 1* – enter your own description in field 1, e.g. company name (max 20 characters),
- *Field 2* – enter your own description in field 2 (max 20 characters),
- *Field 3* – enter your own description in field 3 (max 20 characters),

PRINTOUT \ RS-232C

□ Auto-header
□ Header
□ Values
□ Footer
□ Field 1:
□ Field 2:
□ Field 3:
Exit

After selecting *the Header* , *Values* or *Footer options* , you can select which fields are to be sent from the balance. The choices include:

- *Field 1 – entered as above,*
- *Field 2 – entered as above,*
- *Field 3 – entered as above,*
- *User ID* – identification number of the balance User,
- *Date* – current date,
- *Time – current time,*
- *Measurement number* – consecutive measurement number,
- *Product ID* – product identification number,

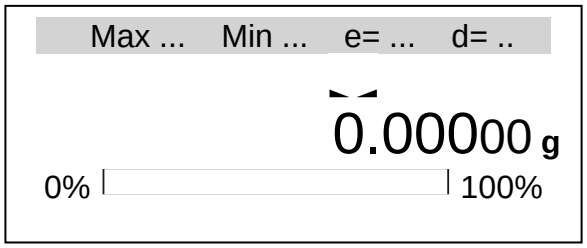
PRINTOUT \ RS-232C \ HEADER

□ Blank line
□ Field 1
□ Field 2
□ Field 3
□ Mode
□ Date/Time
□ Model
□ S/N
□ ID user
□ User name
□ ID product
□ Barcode
□ Product name
□ Signature
Exit

- *Barcode* – product code (entered or scanned),
- *Count* – number of pieces (applies to the *Piece Counting application*),
- *APW* – unit mass of a detail (applies to the *Piece Counting application*),
- *Net* – net weight,
- *Tare* – tare (packaging weight),
- *Gross* – gross weight,
- *totAL* – total mass (applies to the *totAL application*),
- *Inline print number* – placing the printout number in one line with the weighing result

Attention:

When entering *the product ID,* you can use a scanner connected to the RS232C input.



PRINTOUT

1. Header
2. Footer + reset
3. Footer
4. Reset measurement number: 0
5. Exit

While the balance is working, press the key briefly sends data to a printer or PC.

Long pressing the key displays the print menu:

- *Header* – header printout,
- *Footer + reset* – print footer and reset the measurement number,
- *Footer* – footer printout,
- *Reset measurement number* .

An example of what the printout will look like during normal weighing (printout options inactive):

```
20.7005 g
20.4001 g
20.4001 g
```

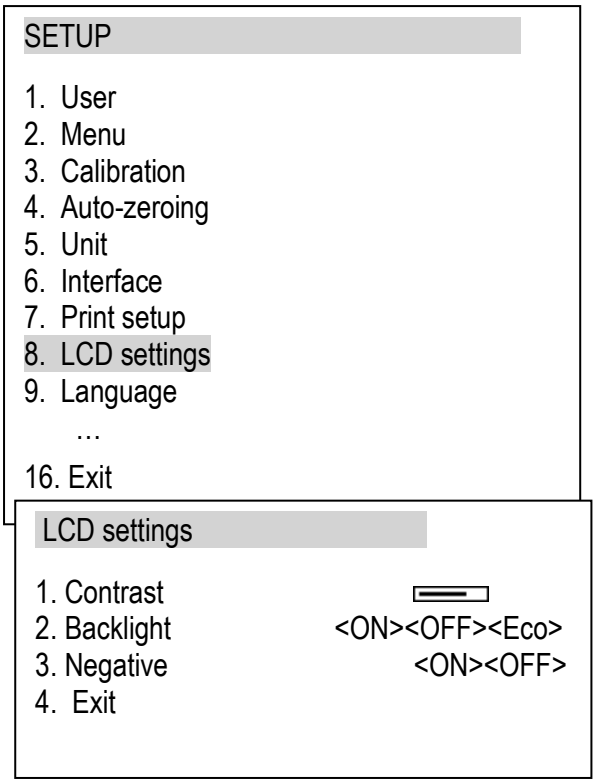
Example of the printout during normal weighing with the clock option (printout options inactive):

```
200.7005 g  2015-11-08   10:01
200.4001 g  2015-11-08   10:01
200.4001 g  2015-11-08   10:01
```

Example of the header and value printout during normal weighing with the clock option (selected printout options active):

```
AXIS company
ALN220G
MAX:  220g    e=0.001g   d=0.0001g
S/N  :  100

ID user          : 000001
Date             :  2012-11-08
Time             :  12:26
Print no         :   3
ID product       :  000001
PCS              :  0 PCS
APW              :  0.0000 g
Net              :  11.8000 g
Tare             :  0.0100 kg
Gross            :  11.8100 g
Total            :  33.0100 g
```

15. 8 LCD Settings

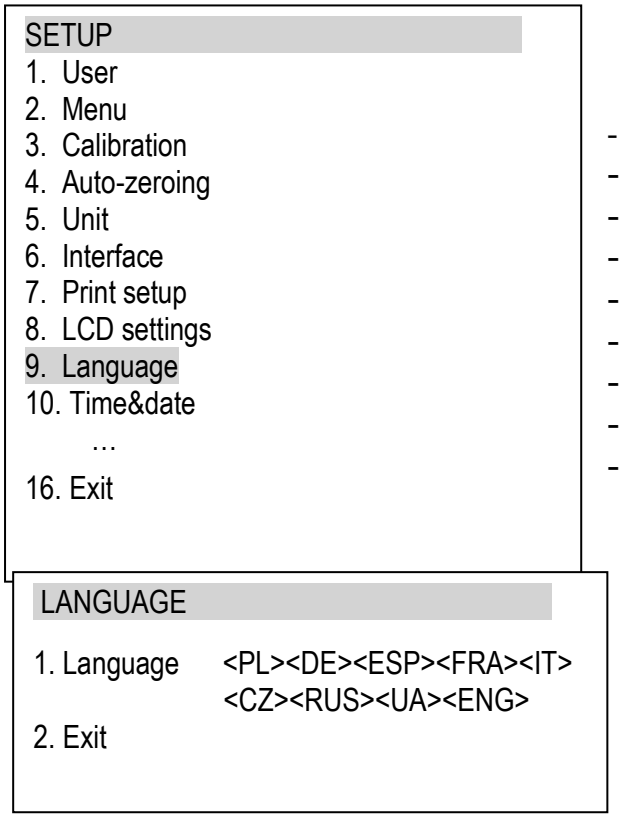


This function allows you to set the contrast and backlight of the balance display.

The function has the following options:

- *Contrast* – setting the LCD contrast,
- *Backlight* – setting the background brightness
- *Negative* – black background, white letters on the display,

15.9 Language selection



The function allows you to select the balance's menu language:

- Polish
- German,
- Spanish
- French
- Italian
- Czech
- Russian
- Ukrainian
- English

15.10 Setting the date and time

SETUP

1. User
2. Menu
3. Calibration
4. Auto-zeroing
5. Unit
6. Interface
7. Print setup
8. LCD settings
9. Language
10. Time&date
11. Keyboard
…
16. Exit

The function allows you to enter the current time and date and choose how they are displayed.

Option description:
PIN – after entering the PIN code [4 digits], it will not be possible to change the time and date settings without entering this code (if it is to be used, remember this code, or preferably write it down!)
Main screen – when you select on, the date and time will be permanently displayed on the main screen

TIME&DATE

1. Time: 09:11:03
2. Date: 2015-10-01
3. PIN ...
4. 12/24: <12H><24H>
5. Form.: <YYYY-MM-DD><MM-DD-YYYY><DD-MM-YYYY>
6. Main screen <on><off>
7. Exit

15.11 Keyboard options

SETUP

1. User
2. Menu
3. Calibration
4. Auto-zeroing
5. Unit
6. Interface
7. Print setup
8. LCD settings
9. Language
10. Time&date
11. Keyboard
12. Analog output
…
16. Exit

The function allows you to set options related to the balance's keys: sound when pressing a key and the computer keyboard input activity mode.

KEYBOARD

1. Sound <on><off>
2. Mode <1><2>
3. Exit

Mode 1 allows you to enter numbers and letters, Mode 2 - digital only.

15.12 Analog output (option)

SETUP

1. User
2. Menu
3. Calibration
4. Auto-zeroing
5. Unit
6. Interface
7. Print setup
8. LCD settings
9. Language
10. Time&date
11. Keyboard
12. Analog output
13. Speed
14. Defaults
15. Service
16. Exit

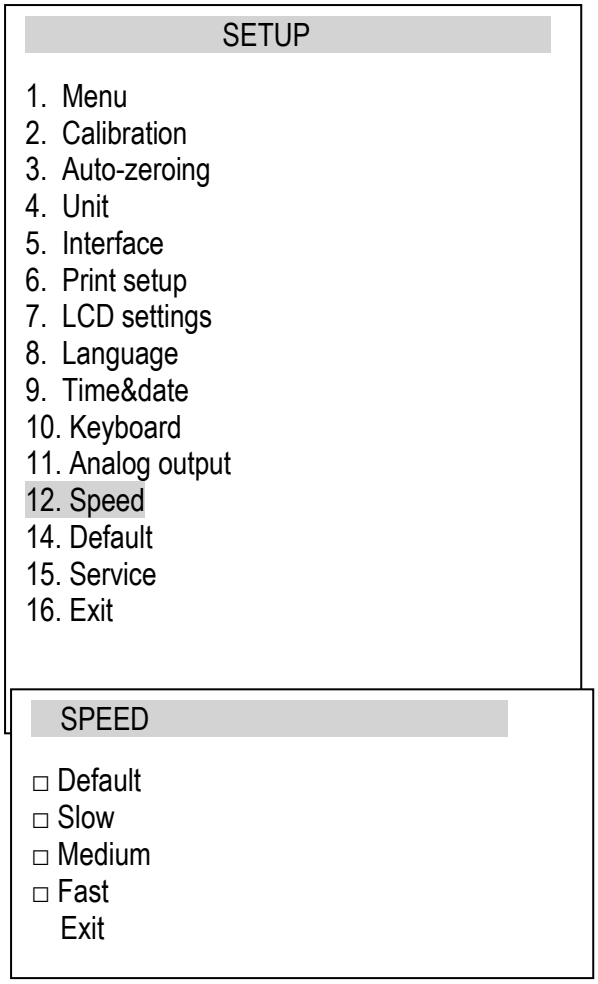
ANALOG OUTPUT

1. Range:	<…>
2. Mode:	<-><+/-><+>
3. Exceed:	<Zero><Max
4. Exit	

The function allows you to set options related to the analog output:

- Range – mass value at which the analog output reaches its maximum value,
- Mode – falling, falling-rising, rising characteristics,
- Exceed – analog output status when the balance's measuring range is exceeded (H or L indication)

15.13 Speed

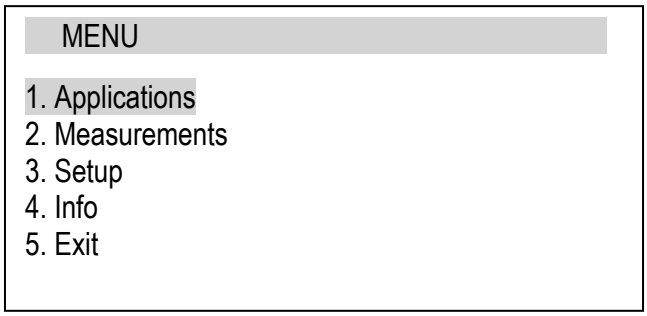


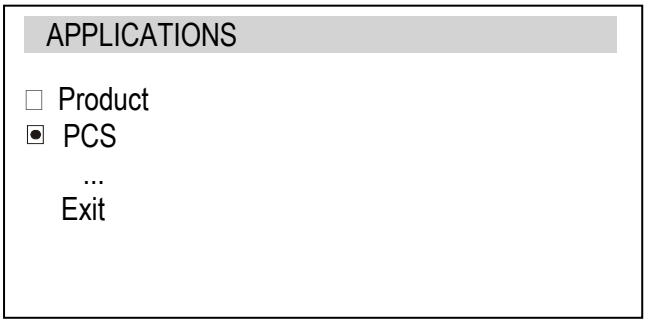
The option allows you to change the weighing speed, which allows you to better use the balance's capabilities and adapt it to the measurement conditions.
Option description:
- Default – weighing speed set at the factory,
- Low – low speed, slow measurement,
- Medium – average speed,
- Fast - accelerated weighing.

Attention:
When setting the High option, check whether the measurement results are stable, if not, select a slower option.

16. Applications

The balance enables the use of a number of practical applications (special functions). Before using them, the User should create his own menu where he can place the applications he is interested in (see section 15.1).





To use the options use the *MENU key* .

- *Applications* – User's own menu,
- *Measurements* - option related to ALIBI memory, allows you to view the last 1000 measurements,
- *Setup* –creating personalized menu, calibration, balance options settings,
- *Info* – information about the balance,
- *Exit* - exit from the menu

Move the cursor to *Applications* and press *ENTER* .

The User menu will be displayed, consisting of the applications that have been previously selected by the user (see *Setup/Menu options*).

Applications currently active are marked with the sign ⊡. It is possible to activate several applications at the same time, as long as the applications do not conflict with each other.

List of available applications:

- Product – product database
- PCS - piece counting
- Unit - selection of the current mass unit
- Percent - percentage conversion
- Label* - selection of label number
- Weighing animals
- Tare set - saving the entered tare value
- MAX/MIN - indication of the maximum value
- Newton - indications in units of force
- Total - adding up a series of weighings
- Thresholds - comparison with set threshold values
- Statistics - statistical calculations
- Paper
- Density
- Recipe

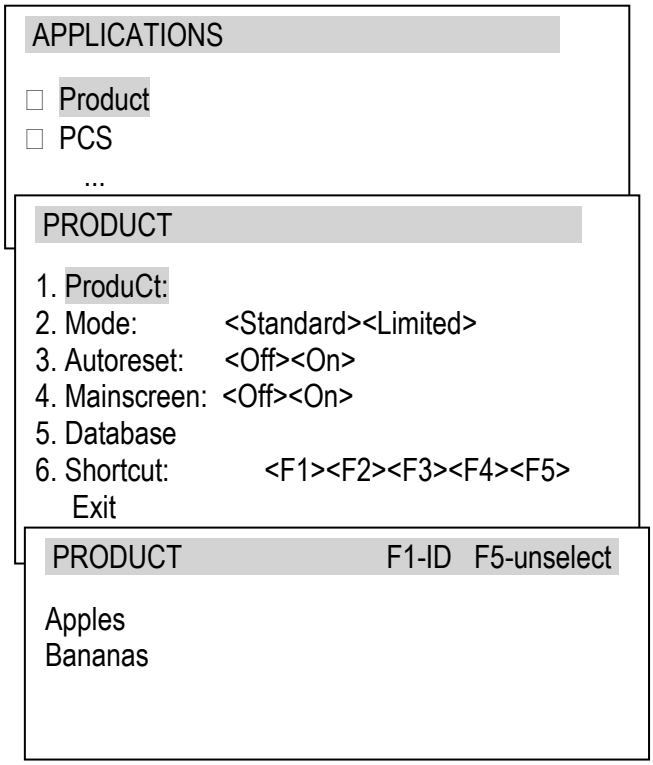
It should be noted that some utility functions are related to hardware options, the presence of which allows them to appear in the menu and be fully functional:

- the comparison function with set threshold values has full functionality if the balance has an OUT connector ⎍

* The *LabEL function* is available only in balances with the *EPL or EPL-A data transmission protocol* (see *Setup* / *Interface*).

16.1 Product database

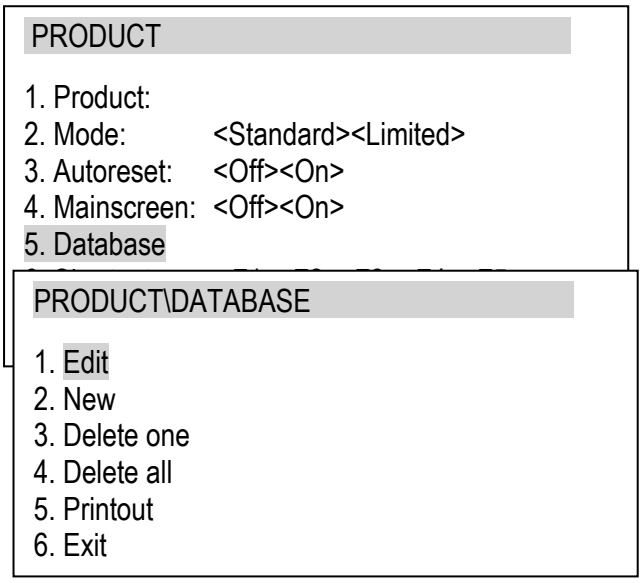
The product database allows you to add, edit or select a product. Select *Applications* and select *Product* (remember to activate the *Product applications* before use).



- *Product* – opens the list of products,
- *Mode* – changing the operating mode of the product database:
  Standard – work with products from the database and beyond,
  Limited – work with products only from the database,
- *Autoreset* – after each measurement is sent (to a printer or computer), deselecting product,
- *Main screen* – product name on the main weighing screen,
- *Database* – adding, editing, printing and deleting products,
- *Shortcut** – quick access key to the product list, use the navigation keys to select the shortcut key: F2, F3 ... or F5.

  After selecting the Product item, the user can select a product from the list or press F1 and enter the ID of the product he or she is looking for.

REMEMBER:
Setting a keyboard shortcut allows for quick access to the product list from the main weighing screen.



Base Options :
- *Edit* – editing product data,
- *New* – adding a new product,
- *Delete one* – deleting one product,
- *Delete all* – deleting all products,
- *Printout* – printout of the product list.

PRODUCT EDIT

1. ID:
2. Barcode:
3. Name:
4. Label No:
5. Tare
6. MIN tresh.:
7. MAX tresh.:
8. Application <-><PCS><PRC>
9. Parameter 1:
10. Parameter 2:
11. Parameter 3:
12. Parameter 4:
13. Save
14. Exit

After selecting *Edit* or *New* , the following options will be available:

- *ID* – product identification code (max 8 characters),
- *Barcode* – product barcode (max 16 characters),
- *Name* – product name (max 20 characters),
- *Label number* – setting the corresponding label number for a given product, useful when the user uses a labeling machine,
- *Tare* – product tare,
- *MIN threshold* – minimum threshold value for the product,
- *MAX threshold* – maximum threshold value for the product,
- *Application* – enable if selecting this product is to automatically turn on the piece counting (PCS) or percentage (PRC) applications,

Parameters 1-2 can be set with the Application option enabled:

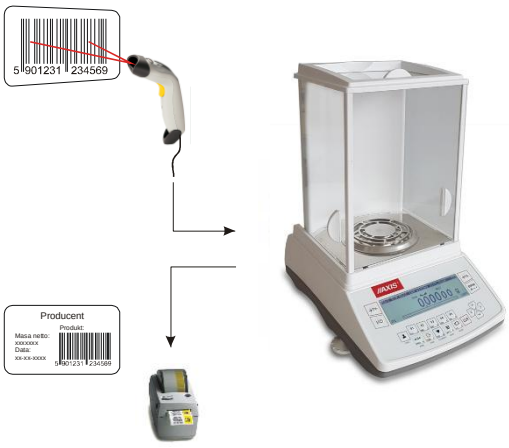
	P.C.S	PRC
Parameter 1	Unitary weight	Weight 100%
Parameter 2	Number of sample pieces	-
Parameter 3	-	-
Parameter 4	-	-

Parameters 2-4 are not active in analytical balances.

REMEMBER:

Once you've entered all your product details, select Save.

When a user has many products entered in the balance's database, a barcode reader is useful to quickly find the product.

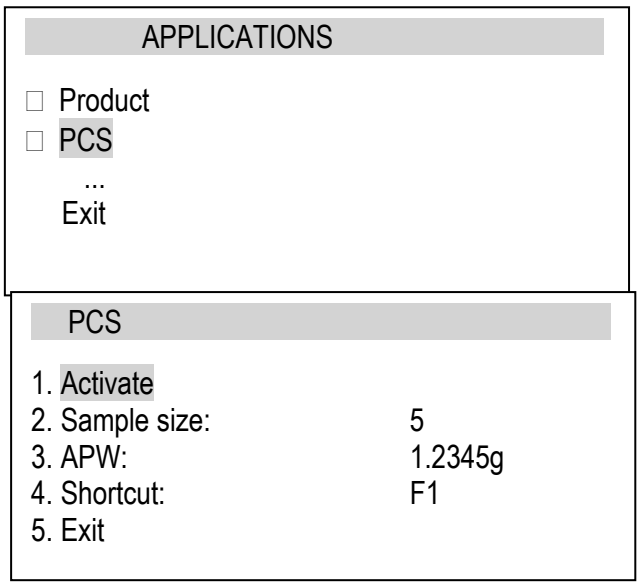


After selecting a product, it is possible to send (to a computer or printer) the current readings along with additional data selected in the *Print function* .

Measurements are also stored in ALIBI balance memory .

16.2 Counting pieces

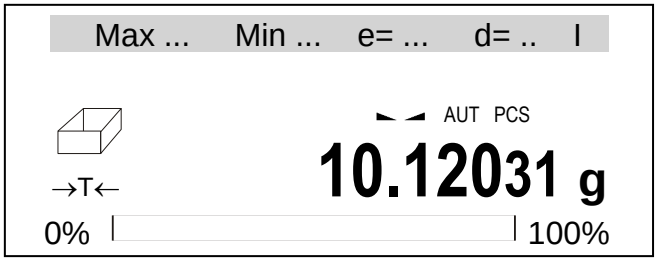
This function allows you to count the details, e.g. screws or nails contained in the weighed portion, based on the mass of a single detail calculated on the basis of the sample. It is recommended that the mass of one detail (APW) is greater than the balance's reading unit and the sample mass is greater than 100 reading units.



Application options:

- *Activation* – turning on piece counting for the current load on the pan and the following settings,
- *Number of pieces* - entering the number of pieces in the sample,
- *APW* - direct entry of the mass of a single detail (digital keys),
- *shortcut* – quick access key, use the navigation keys to select the shortcut key: F1, F2, ... or F5.

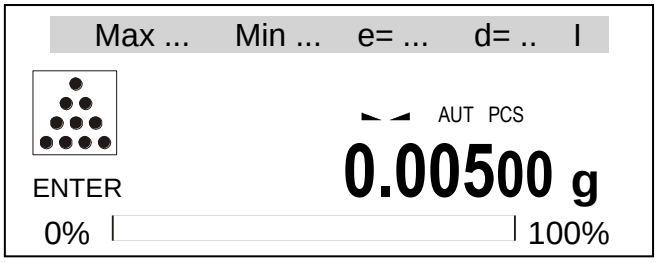
The measurement takes place in three phases:
- taring a container for parts (or an empty pan)
- calculation of the mass of a single detail based on a sample
- counting the details in the weighed portion



Sequence of actions:

Place an empty container on the pan and press the →T← key.

Wait for the balance indication is zero.



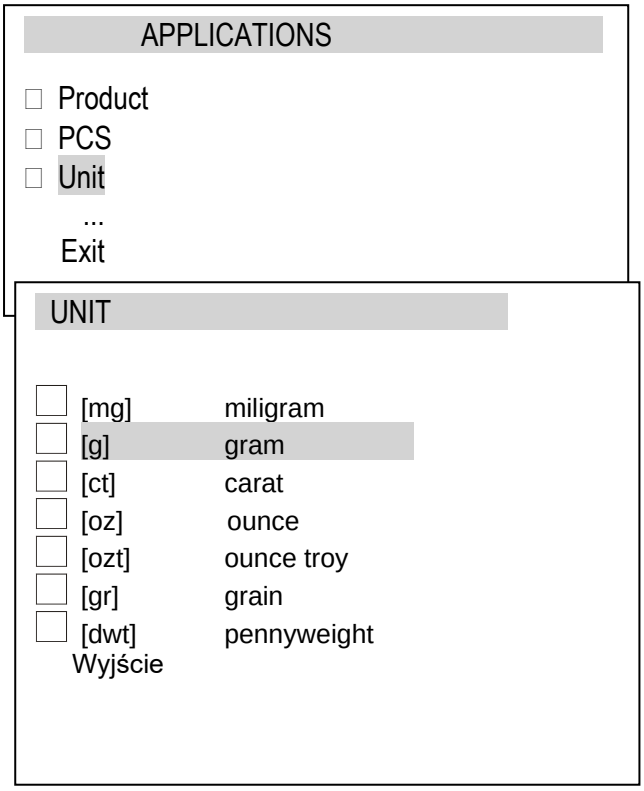
Apply a sample of the previously saved number of pieces and press the *ENTER key* ,

The weight shows the amount of detail. You can add a portion of details to count.

To end the function, press the *MENU key* and then select *PCS* and *Deactivation* .

16.3 Unit

This application allows you to select the currently used weight unit.
The selected unit changes to the default unit when the power is off.

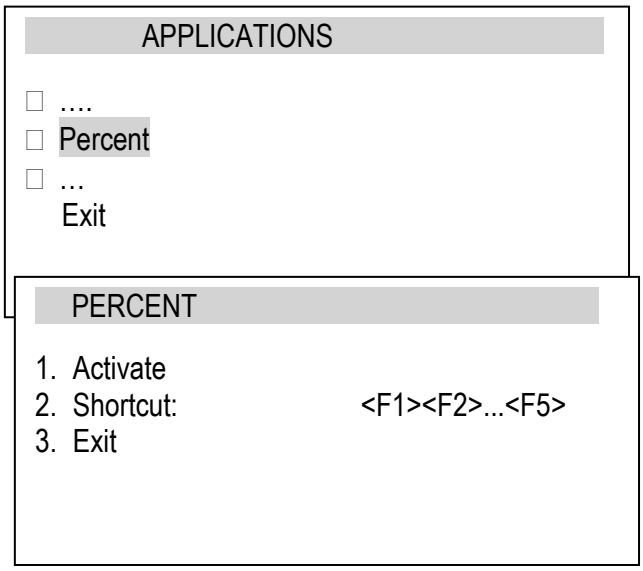


The following units are available:
- grams (g)
- milligram (mg)
- carat (carat): 1ct=0.2g
- pound (English pound): 1lb=453.592374g
- grain (gran): 1gr=0.06479891g
- ounce: 1oz=28.349523g
- ounce troy (pharmacy ounce): 1ozt=31.1034763g
- pennyweight (jewelry unit): 1dwt=1.55517384g

The unit is selected using the navigation keys and the *ENTER key* .

16.4 Percentage

This application allows you to get weight indications results in percent.

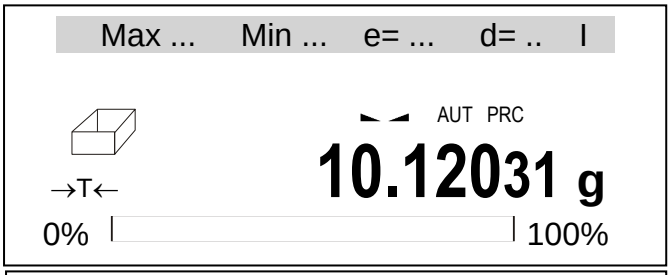


Application options:

- *Activation* - entering the current balance indication as 100%, moving to % indications,
- *Shortcut* – quick access key, use the navigation keys to select the shortcut key: F1, F2, ... or F5.

The measurement takes place in two phases:

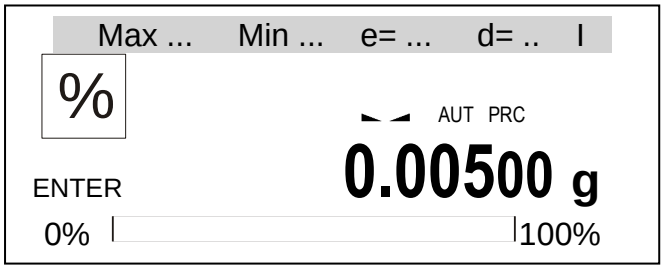
- phase one - measurement of 100% mass,
- second phase - measurement of any mass as a percentage of the mass measured in the first phase.



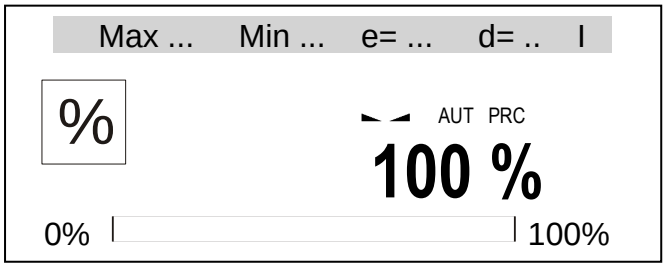
Sequence of actions:

Place an empty container on the pan and press the →T key ←.

Wait for the balance readings to zero.



Apply the 100% reference sample and press the *ENTER key* ,

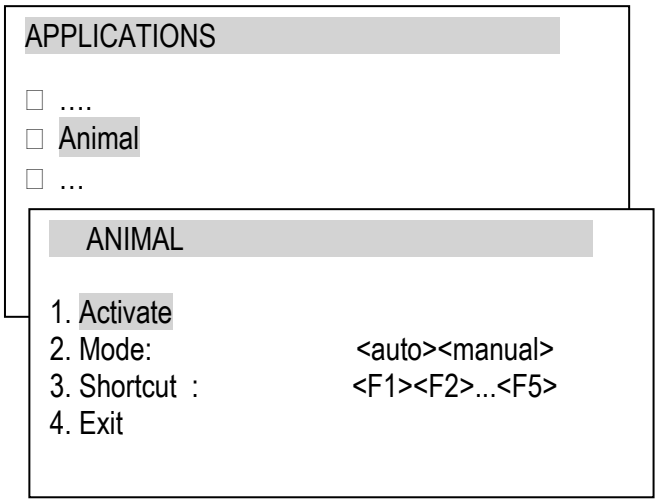


The weight shows in percent.

To finish working with the function, press the *MENU key* and then select *Percent* and *Deactivation* .

16.5 Weighing animals

The application allows you to weigh an animal moving on the balance.

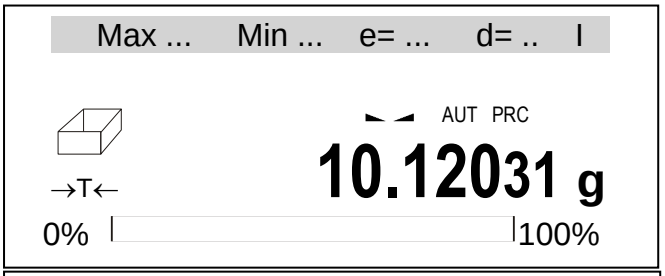


Application options:

- *Activation* - switch to weighing animals,
- Weighing *mode* :

  <auto> – automatic weighing after changing the balance load,

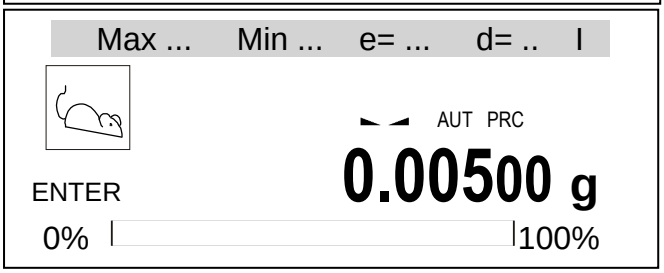
  <manual> – after placing animal and pressing *ENTER key* ,
- *Shortcut* – quick access key, use the navigation keys to select the shortcut key: F1, F2, ... or F5.



Sequence of actions:

Place an empty container on the pan and press the →T key ←.

Wait for the balance readings to zero.



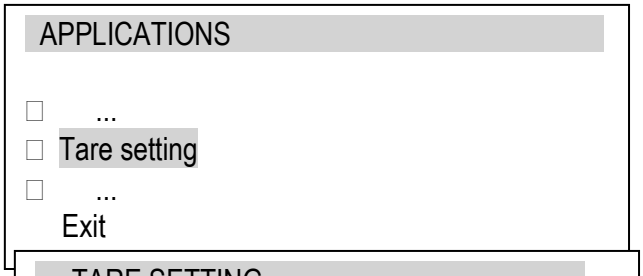
Place the animal in the container and press *ENTER* ,

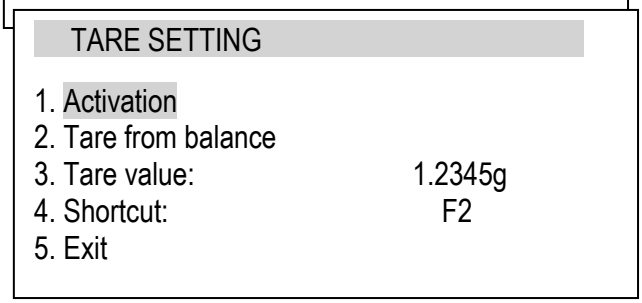
The balance performs a series of measurements and displays the result. Once unloaded, the balance is ready for the next measurement.

To finish working with the function, press the *MENU key* and then select *Animal weighing* and *Deactivation* .

16.6 Tare setting

The application allows you to measure the gross weight of goods in a container of known mass and then read the calculated net weight of the goods. For this purpose, the tare value must be previously entered into the balance's memory. The entered tare value can be recalled by pressing the →*T key* ←when the pan is unloaded (this value appears with the "-" sign).

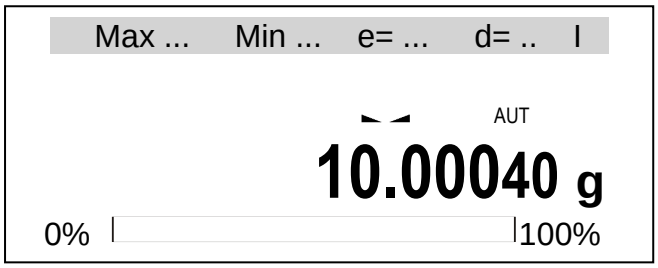




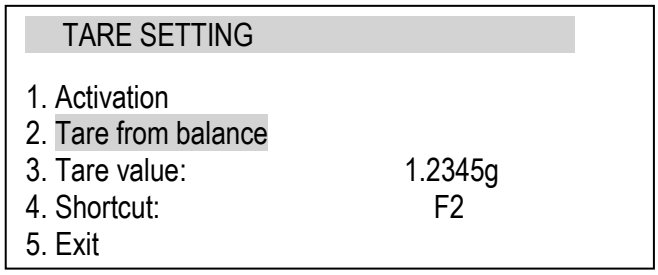
Application options:

- *Activation* – switching to weighing with the entered tare value,
- *Enter the tare value from the balance* – entering the current balance indication as the tare value,
- *Tare value* – value entered using digital keys,
- *Shortcut* – quick access key, use the navigation keys to select the shortcut key: F1, F2, ... or F5.

Sequence of actions:



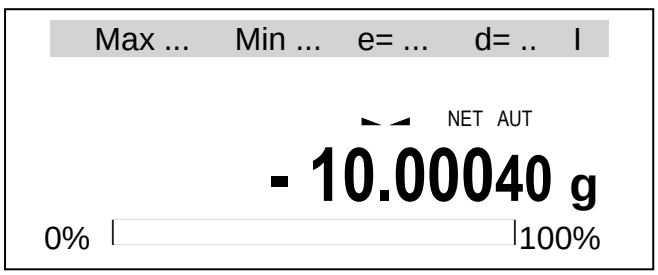
Place the item to be tare on the pan and press the shortcut key corresponding to the *Tare setting application* , e.g. F2.



Application options will appear.

Use the cursor to select *Tare from balance* or Enter *Tare value (enter the value here and press ENTER)* and then *Activation.*

The balance shows indication with tare.

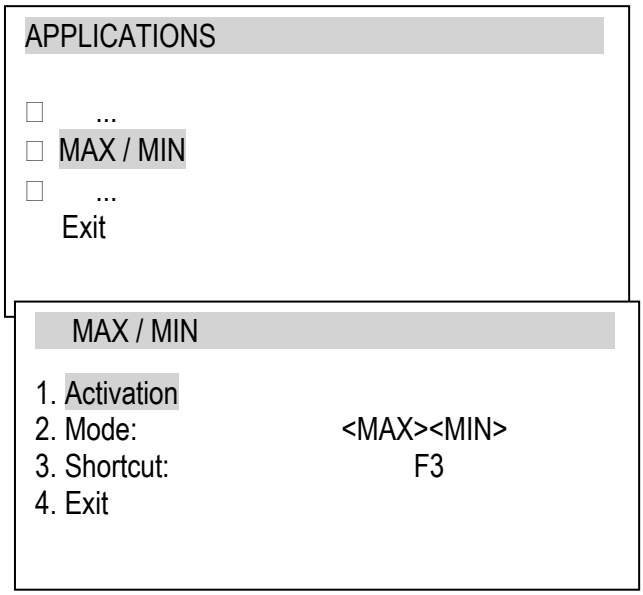


When you press the →T key← or when the pan is empty, the balance will subtract the tare value (it will show a negative indication).

To finish working with the application, press the *MENU key* and then select *Tare setting* and *Deactivation* .

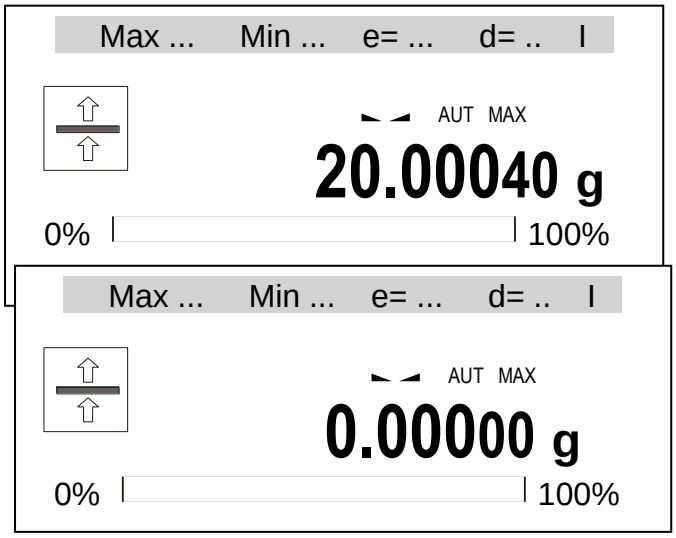
16.7 Displaying the maximum or minimum value (MAX / MIN)

The application allows you to freeze the maximum or minimum value on the display.



Application options:

- *Activation* – switching to weighing with MAX / MIN indication,
- *Mode* – maximum value (MAX) or minimum value (MIN),
- *Shortcut* – quick access key, use the navigation keys to select the shortcut key: F1, F2, ... or F5.



Sequence of actions:

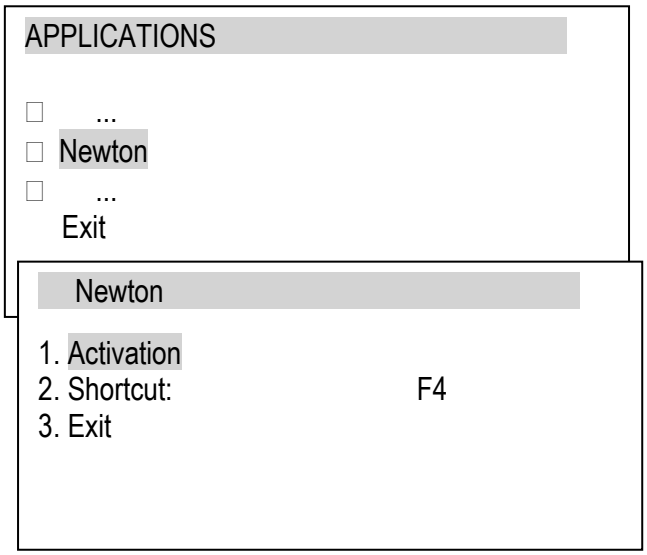
Perform a series of weighings. The balance indicates the highest (or lowest) weight indicated.

T ←key →resets the balance to zero and allows you to start the next series of weighings.

To finish working with the application, press the *MENU key* and then select *MAX/MIN* and *Deactivation* .

16.8 Force indication (Newton)

The application allows you to measure the load force on the weighing pan.



Application options:

- *Activation* - transition to force measurement,
- *shortcut* – quick access key, use the navigation keys to select the shortcut key: F1, F2, ... or F5.

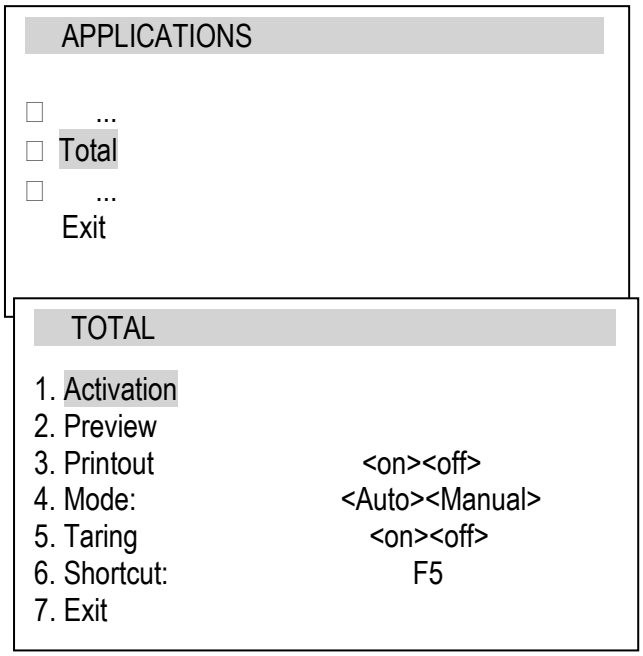
Sequence of actions:

Apply a force to the pan (not exceeding the balance's range!). The balance indicates in force units.

To finish working with the application, press the *MENU key* and then select *Newton* and *Deactivation* .

16.9 Summarizing weighing series (Total)

The application allows summing up subsequent weighings and calculating the average value.

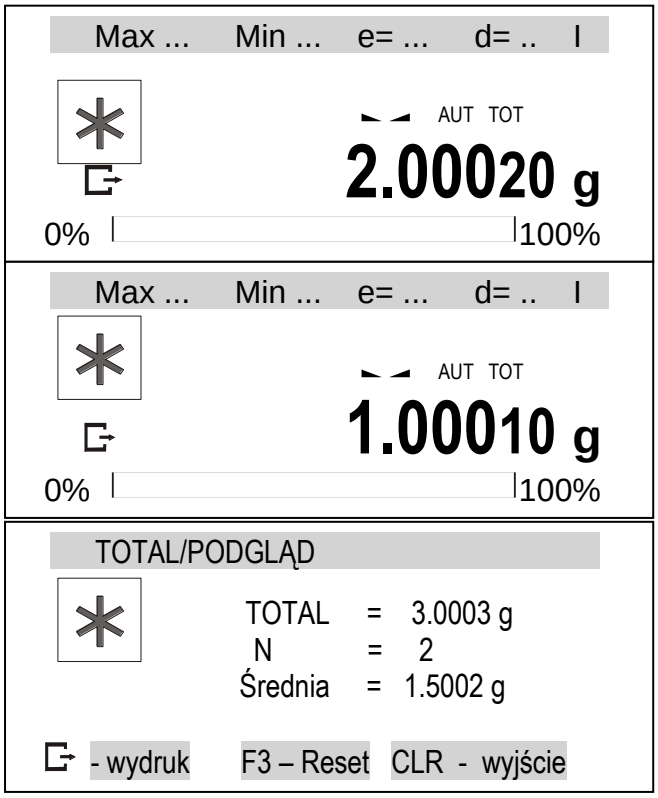


Application options:

- *Activation* – switching to weighing with adding up,
- *Preview* – checking the status of the summing register,
- *Mode* – adding another result,

  < *Auto* > – after the balance indication stabilizes,

  < *Manual* > – after applying the load and pressing the key ⮆,
- Taring – summing with taring after each weighing (without removing the load from the balance)
- *Shortcut* – quick access key, use the navigation keys to select the shortcut key: F1, F2, ... or F5.



Sequence of actions:

Perform a series of weighings, in *Manual mode* , pressing the key ⮆ after each measurement. In *Auto mode* , measurements are saved automatically.

Each measurement entry is confirmed by displaying the sum and average value.

Calling the application and the *Preview option again* (or using the shortcut key) displays the sum, number of measurements and average value, as well as the available options:

⮆ - printout of register contents,

F3 – reset (zeroing) of registers

CLR - return to summing

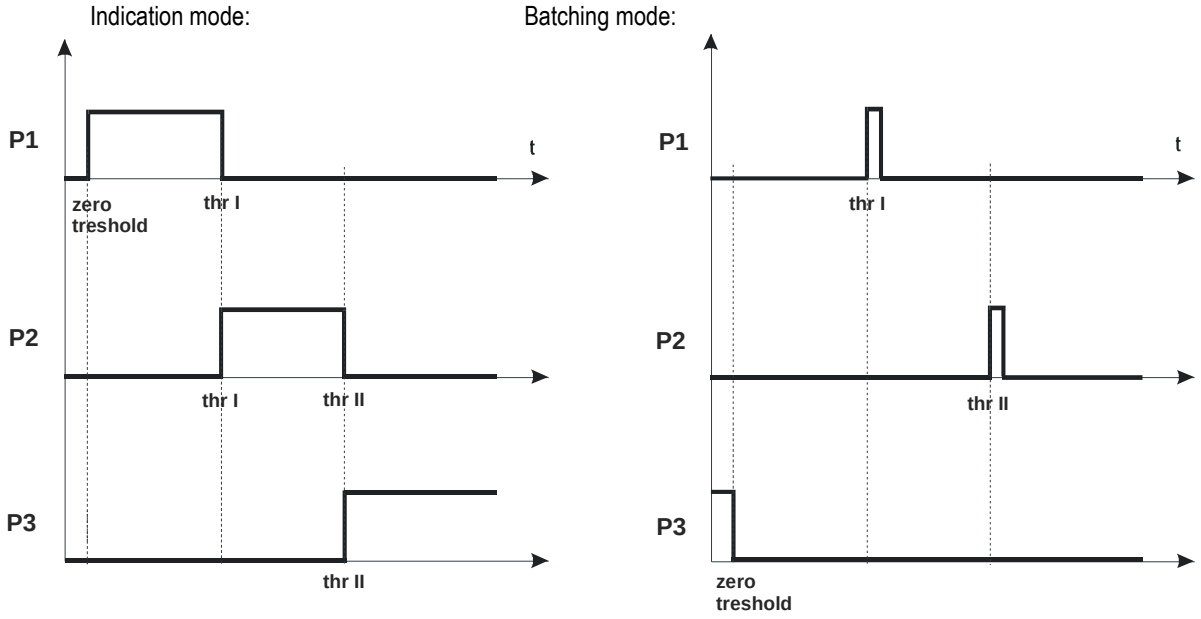
To complete the totalization, call the application again, select *Total* and *Deactivate* .

16.10 Checkweighing function (Thresholds)

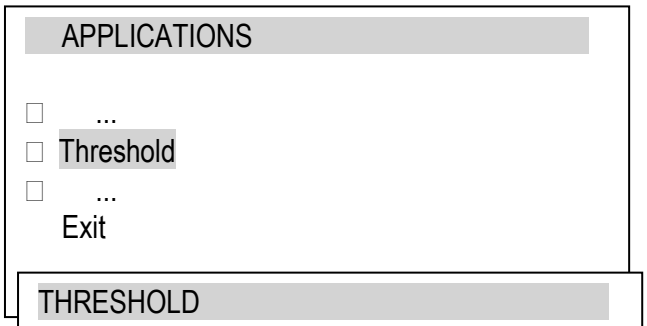
The application allows you to compare the weighing result with two previously programmed mass values: lower and upper threshold. The comparison result is signaled by the indicators lighting up *(MIN, OK, MAX)* and an acoustic signal generated (only in *the Impulse mode*) when the thresholds are exceeded.

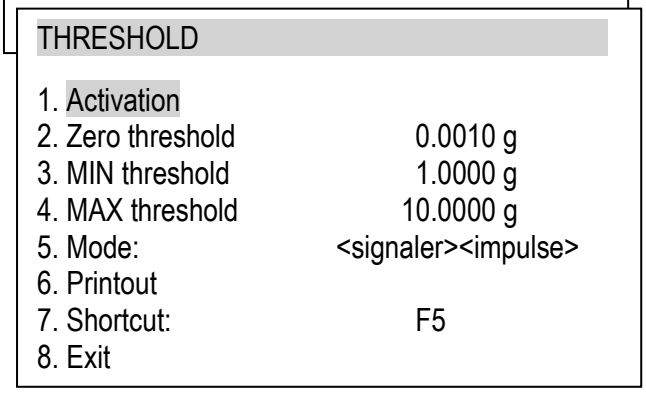
In balances equipped with optocoupler outputs (connector: WY ⎍), the comparison result can be used to control:
- optical indicator (*Signaler mode*),
- dosing devices (*Impulse mode*).

On outputs P1-P3 (*Relays* socket) short-circuit states appear as result of comparison balance indication with threshold values.
On the chart below output states are shown during increasing load on the balance 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.





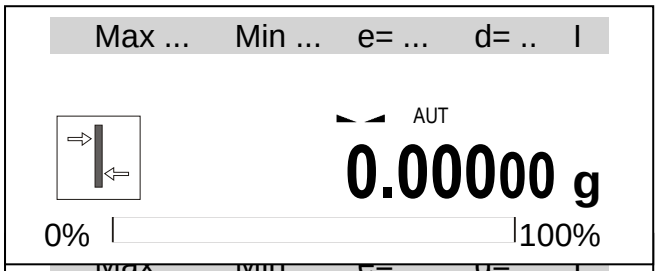
Application options:

- *Activation* – switching to weighing with adding up,
- *Zero threshold* – value of the zero signaling threshold,
- *MIN threshold* – MIN threshold value,
- *MAX threshold* – MAX threshold value,
- *Mode* – adding another result,

  <signaler> – indication mode (chart on the previous page) ,

  < *impulse* > – impulses and sound signal (diagram on the previous page)
- *Print* – printout of threshold values
- *Shortcut* – quick access key, use the navigation keys to select the shortcut key: F1, F2, ... or F5.

Sequence of actions:

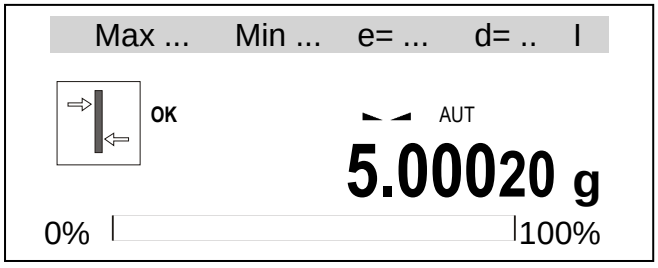


No load (load less than zero signaling threshold) -no signaling.
Apply a load.

Case one:

Load below *the MIN threshold*

- the balance signals a value that is too low - *MIN* .



Case two:

Load above the *MIN threshold* but below *the MAX threshold*

- the balance signals a good value - *OK* (in the *Impulse mode* , an additional short sound signal is added).

Case three:

Load above the *MAX threshold*

- the balance signals a value that is too high - *MAX (* in the *Impulse mode* , additionally and a long acoustic signal).

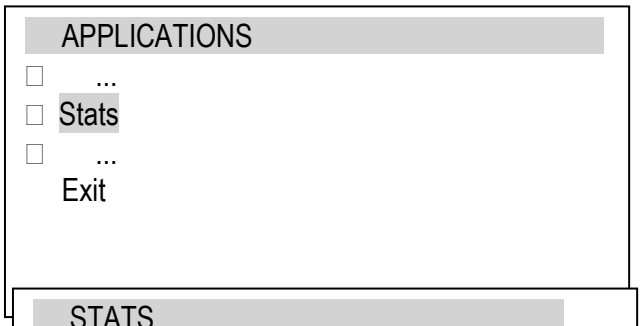
16/11 Statistics

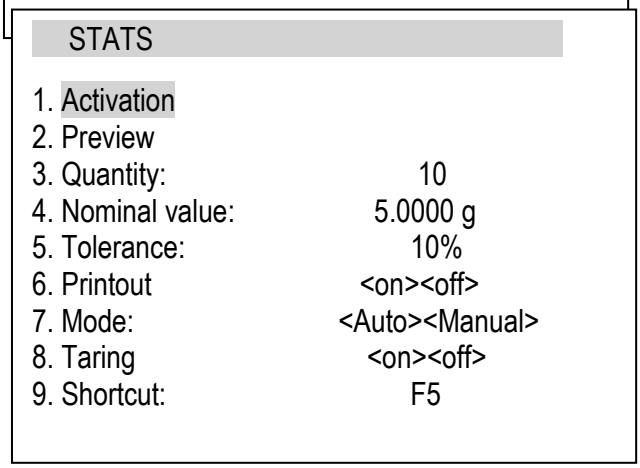
The application calculates the statistical parameters of the weighing process from a series of measurements (max 1000).
Subsequent measurements are counted (entered into the register) automatically after the load is applied and the balance indication stabilizes.
After each load is applied, the following information is printed: measurement number, result, date and time.
It is possible to pass the next measurement after removing the previous load.

For the series of measurements obtained in this way, the balance calculates:

- n -number of samples
- sum x - sum of masses of all n samples $sum_x = \sum x_n$
- $\bar{x}$ -average mass as (sum x)/n
- min - minimum mass in n samples
- max - maximum mass in n samples
- R = max-min - difference between max and min value
- S -standard deviation $S = \sqrt{\frac{1}{(n-1)} \sum_n (x_n - \bar{x})^2}$
- srel -variance coefficient $srel = \frac{S}{\bar{x}}$

The results of statistical calculations can be printed on a connected printer.



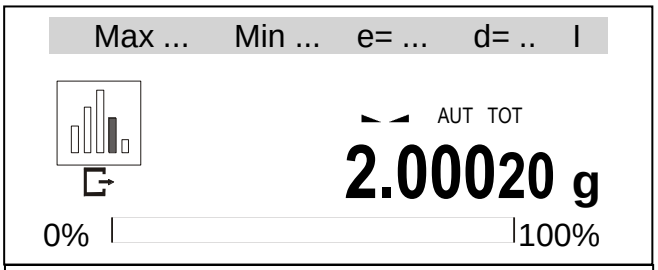


Application options:

- *Activation* – switching to weighing with adding up,
- *Preview* – checking the status of the summing register,
- *Mode* – adding another result,

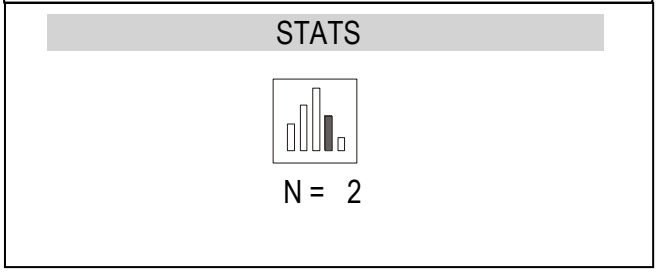
  < *Auto* > – after the balance indication stabilizes,

  < *Manual* > – after applying the load and pressing the key ⮆,
- Taring – summing with taring after each weighing (without removing the load from the balance)
- *Shortcut* – quick access key, use the navigation keys to select the shortcut key: F1, F2, ... or F5.

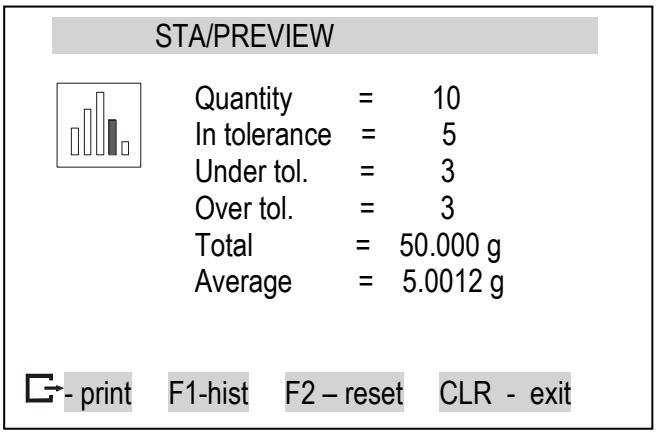


Sequence of actions:

Perform a series of weighings, in *Manual mode* , pressing the key ⮆after each measurement. In *Auto mode* , measurements are saved automatically.



Each measurement entry is confirmed by displaying the sum and average value.



Invoking the application and the *Preview option* (or using a shortcut key) displays statistical results and available options:

⮆- printout of register contents,

F1 – display histogram,

F2 – reset (zeroing) memory,

CLR - return to summing.

To stop working with the application, call the application again and select *Deactivation* .

Using the key causes a printout constantly calculated statistics values and histogram:

N - number of samples,

IN TOL – number of samples included in tolerance range,

-TOL – number of measurements below allowable real value,

+TOL – number of measurements above permissible value,

TOTAL – sum of weights of all weighings,

AVERAGE – average weight (Total)/n,

MIN – minimum weight in N samples,

MAX – maximum weight in N samples,

ST. DEV. - standard deviation,

ST. DEV.% – standard deviation in %.

Print form :

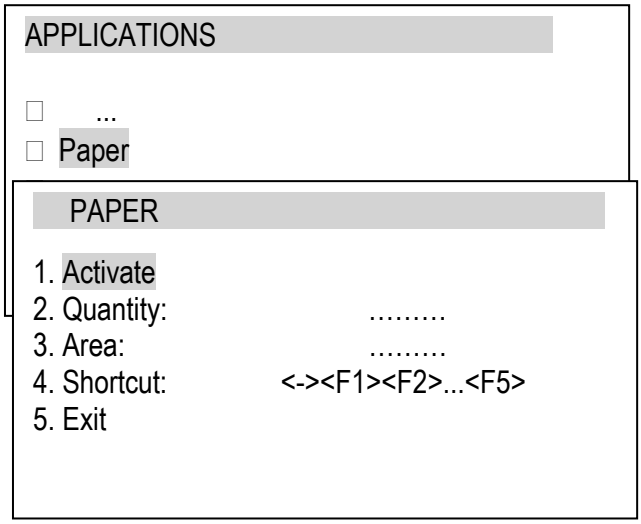
```
------------- STATISICS -------------
NOMINAL  :    50.000 g
TOLERANCE:      100 %
MAX. N   :      500

NO.     SAMPLE       TOL-  NOM   TOL+
1       10.007 g     ! *         !
2       20.125 g     !  *        !
3       20.126 g     !  *        !
4       30.205 g     !   *       !
5       30.204 g     !   *       !
6       30.201 g     !   *       !
7       40.557 g     !    *      !

        •••

N        :        25
IN TOL.  :        25
( TOL-   :         0
) TOL+   :         0
TOTAL    :  1264.664 g
AVERAGE  :    50.587 g
MAX      :    91.131 g
MIN      :    10.007 g
MAX-MIN  :    81.124 g
ST.DEV.  :   20.6480 g
ST.DEV.% :     40.82 %

------------- HISTOGRAM -------------

(TOL-   0 ▌
        0 ▌
        1 ▌
        2 ▌
        3 ▌
        4 ▌
        5 ▌
        4 ▌
        3 ▌
        2 ▌
        0 ▌
        1 ▌
>TOL+   0 ▌
```

Description of cooperation between the statistics function and a computer and printer

The balance has interfaces to which you can connect a computer and a printer. After each data printout by the printer, an identical set of data is sent to the computer. After the computer sends the SA CR LF (53h 49h 0Dh 0Ah) initialization signal, the balance sends statistical data contained in a histogram to the computer.

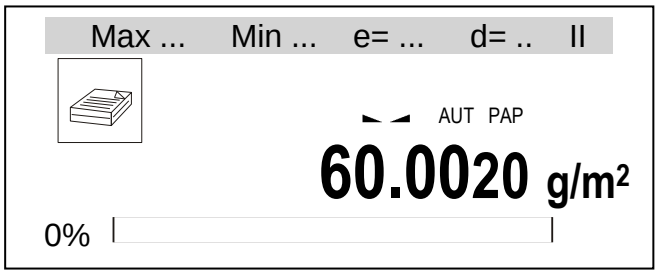
16.12 Determining the paper weight (Paper)

The application allows you to calculate the weight of 1 m ^{2} of paper based on a sample of several pieces of known area.



Application options:

- *Activation* – grammage calculation,
- *Number* – sheets of paper quantity,
- *Area* – sheet surface area [in m2],
- *Shortcut* – quick access key, use the navigation keys to select the shortcut key: F1, F2, ... or F5.



Sequence of actions:

After entering the number of sheets and their area, use the *Activation option* .

The paper weight calculated as the quotient of weight and area per sheet will be displayed.

To disable the application, launch the application again, select *Paper* and *Deactivate* .

16.13 Determining Density (Density)

The application allows you to determine the density of a solid based on the weight in air and the weight of the material immersed in a liquid of known density according to the formula:

$$\rho = \frac{m_1}{m_1 - m_2} * \rho_{liquid}$$

Where:

m_1 -mass in air
m_2 -mass in liquid

The measurement consists of two phases:
Phase I – measurement of a solid sample in air
Phase II – measurement when the sample is immersed in the liquid

The function also allows you to determine the density of the liquid based on the weight of the plunger (with a known volume) in air and in the tested liquid. The formula is used:

$$\rho = \frac{m_1 - m2}{V}$$

Where:

m_1 -mass of the plunger in air
m_2 - mass of the plunger in the liquid
V – plunger volume

The volume of the plunger is indicated on its hanger.

Here, too, the measurement takes place in two phases:
Phase I – measurement of the plunger in air
Phase II - measurement when the plunger is immersed in the tested liquid

Density with compensation for the influence of air density is also calculated (*Density with compensation*).

A more detailed description is provided with *the Hydro Kit* .

APPLICATIONS

□ ...
□ Density
□ ...
Exit

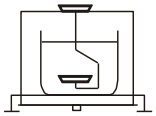
DENSITY

1. Activate
2. Preview
3. Type of material: <solid><liquid>
4. Type of liquid: <Water><Ethanol><Other>
5. Liquid type: g/cm3
6. Shortcut: <-><F1><F2>...<F5>
7. Exit

Application options:

- *Activation* - transition to density measurement,
- *Preview* – checking the status of the summing register,
- *Type of material* – solid or liquid,
- *Type of liquid* – water, ethanol or other (enter density here),
- *Shortcut* – quick access key, use the navigation keys to select the shortcut key: F1, F2, ... or F5.

Max ... Min ... e= ... d= .. II



→T←

AUT DEN

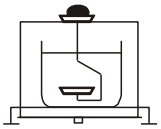
0.00000 g

0%

Sequence of actions for a solid:

After selecting the type of material, type of liquid or its density and turning on *Activation,* tare the balance with the *→T key ←.*

Max ... Min ... e= ... d= .. II



ENTER

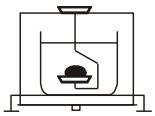
AUT DEN

10.09000 g

0%

Place the solid to be tested on the upper tray (measurement in air) and press *ENTER* .

Max ... Min ... e= ... d= .. II



ENTER

AUT DEN

8.09100 g

0%

Place the solid being tested on the lower tray (liquid measurement) and press *ENTER* .

DENSITY/PREVIEW

ρ

Mass in the air : 10.090g
Mass in the liquid : 8.0910g
Mass density : 5.0370g/cm3
Density with comp.: 5.0360g/cm3

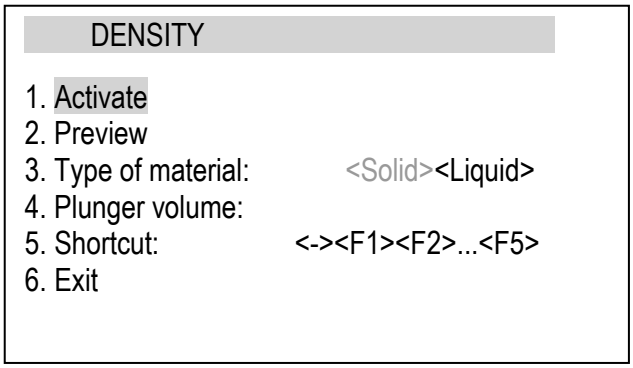
- print CLR - exit

The results and available options are displayed:

- printout of register contents,

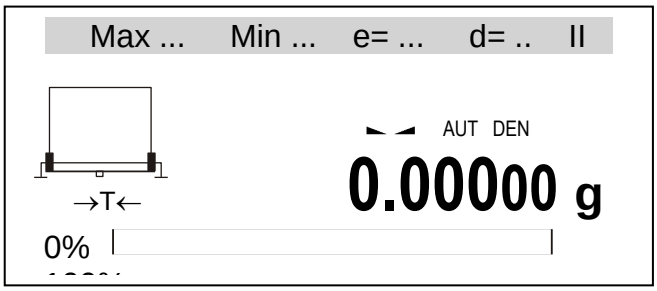
CLR - return

To stop working with the application, call the application again and select *Deactivation* .



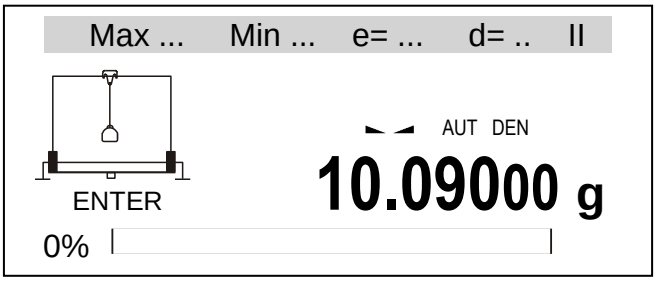
Application options:

- *Activation* - transition to density measurement,
- *Preview* – checking the status of the summing register,
- *Material type* – solid or liquid,
- *Plunger volume* – enter the volume value given on the plunger here,
- *Shortcut* – quick access key, use the navigation keys to select the shortcut key: F1, F2, ... or F5.

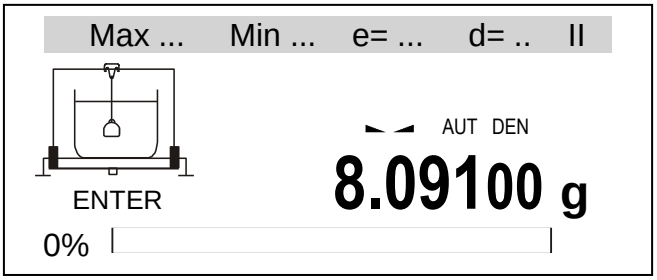


Sequence of actions for liquids:

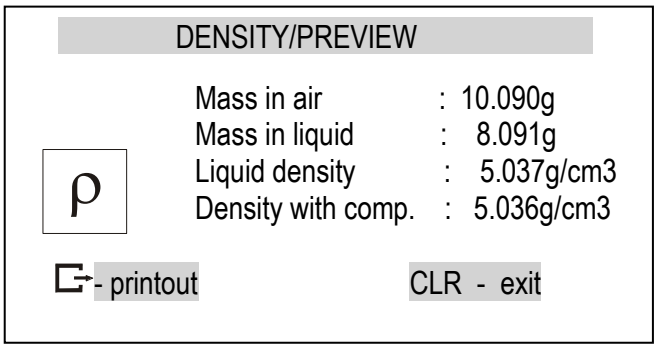
After selecting liquid as the material type, entering the plunger volume and turning on *Activation,* tar the balance with the *→T key ←.*



Hang the plunger without immersing it in the beaker with the liquid being tested (measurement in air) and press *ENTER* .



Suspend the plunger by immersing it in the beaker with the liquid being tested (measurement in liquid) and press *ENTER* .



The results and available options are displayed:

- printout of register contents,

CLR - return

To stop working with the application, call the application again and select *Deactivation* .

Report printout:

To print measurement results, connect a printer to the balance's RS232C output. The connection method is described in the chapter on balance communication.

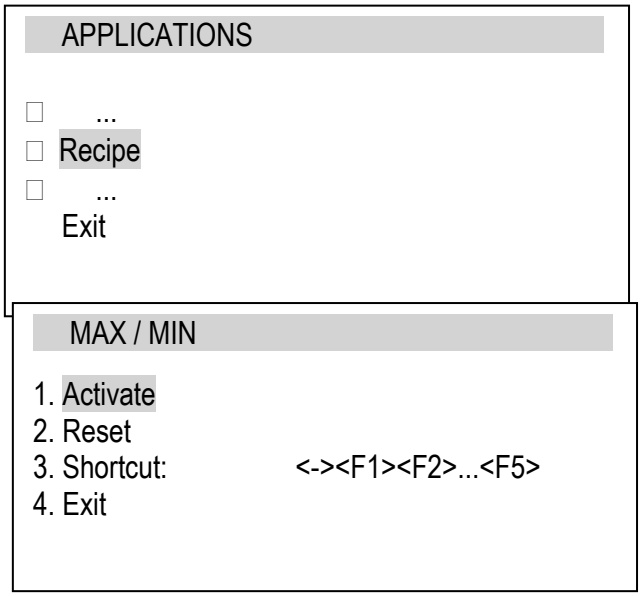
After each measurement, a printout can be obtained by pressing the key (you can also select *the Print report option with the cursor* and press *ENTER*).

Print form:

Measurement number	=
Mass in the air	= ...g
Mass in liquid	= ...g
Density...	= ...g/ cm^3
Density with compensation	= ... g/ cm^3
Water density	= ...g/ cm^3
Temperature of water	= ... ^oC

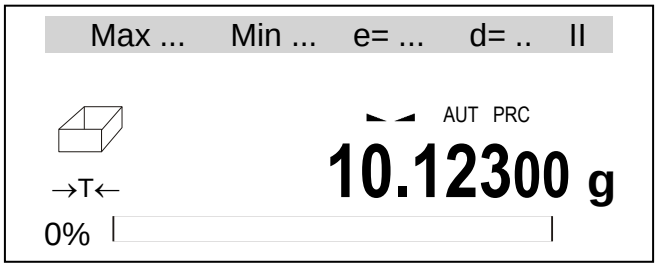
16.14 Preparing recipes (Recipe)

This application allows you to weigh several ingredients in one vessel with the ability to read the total weight of all ingredients weighed so far.



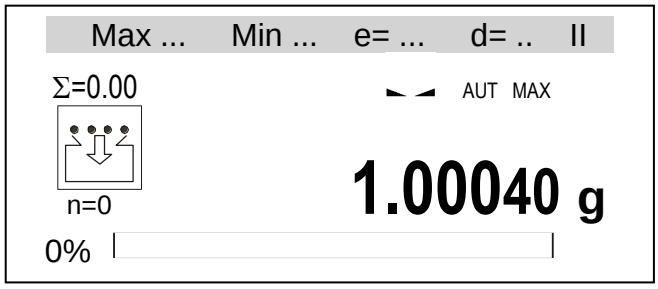
Application options:

- *Activation* – switching to weighing with multiple taring,
- *Reset* – deleting the result,
- *Shortcut* – quick access key, use the navigation keys to select the shortcut key: F1, F2, ... or F5.

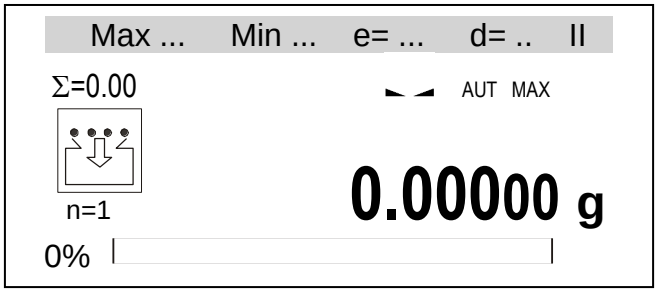


Sequence of actions:

Place the vessel on the pan and tare the balance with the *→T key ←.*



The balance is ready to weigh subsequent ingredients. After weighing each ingredient, press the →T key ←. This will reset the balance readings to zero. The sum of previously weighed ingredients ( ) and their quantity (n) are displayed on the left .Σ



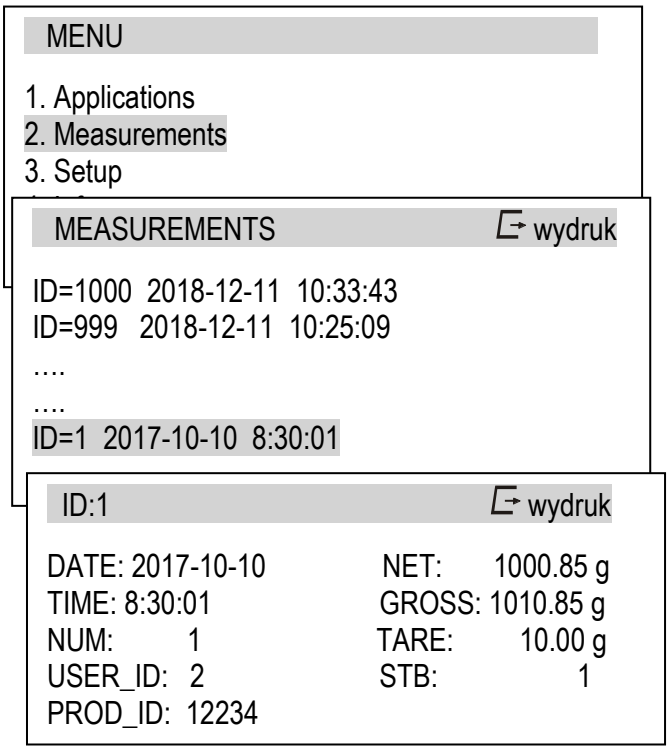
At any time, you can use the key to read the total mass of all weighed ingredients ↻(pressing the key again will return you to weighing the ingredient).

To finish working with the application, press the *MENU key* and then select *Recipe* and *Deactivation* .

17. Measurement database (Alibi memory)

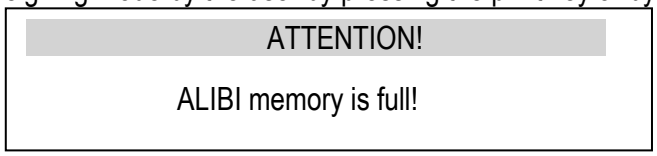
In balances with additional DSD memory (called ALIBI memory), it is possible to save and read 100,000 confirmed measurement results. Confirmation of measurements for recording takes place while displaying the result using the key ⮆. Writing to memory will also take place automatically with each transmission operation on any interface (more information in chapter *Setting interface parameters , Sending* option).

Measurements option allows you to view and send (to a computer or printer) the last 1,000 measurements.



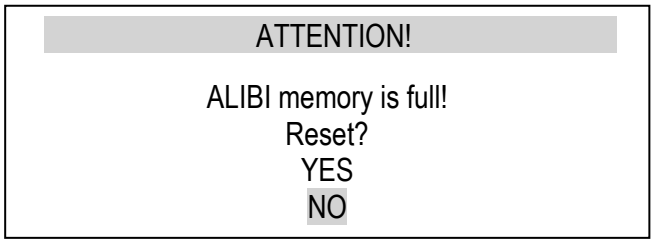
Measurements are stored with identification number, date, product number, etc. in the form of records. They are displayed in order from newest to oldest.
The user can view the measurements using the navigation keys or by pressing the key⮆ send them to your computer/printer. When transmitting data to a computer using the *Axis Balance Manager program* , the transfer of records is secured with a parity bit, transmission parameters 115,200 bps/8-bit/even. Entering the selected measurement (by pressing the *Enter key*) allows you to preview detailed data. At this point, it is also possible to send a single measurement (to a computer/printer) by pressing the key ⮆.

The DSD (ALIBI) memory allows reading a maximum of 100,000 records of the latest weighings, understood as data transmission operations via one of the balance's communication interfaces, initiated in weighing mode by the user by pressing the print key or by the automatic print mechanism.



When the DSD memory is full, a warning and an acoustic signal appears

When the DSD memory is full, subsequent records overwrite the oldest ones (e.g. record no. 100,001 replaces record 1, 100,002 replaces record 2, etc.). Individual weighings are identified by a measurement identification number (REC_ID).



After reaching the maximum value, the ID number (REC_ID= 4 294 967 295), if you try to confirm another measurement, a warning and an acoustic signal appears

After selecting the YES option , the memory is deleted and the next measurement identifier is set to 1. Selecting NO exits the warning screen without any changes, giving you the opportunity to read the memory before deleting it.

The entire DSD memory can be read by the Axis Balance Manager program. The balance should be turned on and connected to the computer using one of the available interfaces: RS-232C, USB (USB Device or

USB Serial) or LAN. The balance interface configuration should enable connection to the Axis Balance Manager program.

Example of printing all measurements:

```
MODEL: ACA2200G
S/N: 12345678
PROD.DATE: 2018-12-19
REC.COUNT: 2
REC_ID;DATE;TIME;NUM;USER_ID;PROD_ID;NET;GROSS;TARE;UNIT;POINT;STB
1000;2018-07-11;10:33:43;2;2;1;1101.07;1111.08;10.01; g ;2;1
999;2018-07-11;10:25:09;1;2;1;1000.85;1010.85;10.00; g ;2;1
…
1;2017-01-01; 8:30:01;1;2;1;1000.85;1010.85;10.00; g ;2;1
```

Example of printing a single measurement:

```
MODEL: ACA2200G
S/N: 12345678
PROD.DATE: 2018-12-19
REC.COUNT: 2
REC_ID;DATE;TIME;NUM;USER_ID;PROD_ID;NET;GROSS;TARE;UNIT;POINT;STB
1;2017-01-01; 8:30:01;1;2;1;1000.85;1010.85;10.00; g ;2;1
```

17.1 Detailed description of data transfer from Alibi memory

Alibi memory (FLASH type) is located on the balance's main board. In a verified balance, it is not possible to physically access it without breaking the legalization seals. The balance software does not allow the user to freely edit or delete it. However, the user can view and print a maximum of 1,000 recent records. Records are secured with a simple crc checksum, calculated as the complement of the least significant byte of the sum of data bytes written directly to FLASH memory. Inconsistency of the sums, calculated on an ongoing basis and saved with the record, is signaled when reading the record fields (except REC_ID) with question marks. Due to the fact that the correct data is sent after conversion into text form, comparison of checksums outside the balance is not possible. The crc sum does not appear in the sent record.

Data record structure in Alibi memory:	Equivalents in the read record:
{	
typedef struct	
{ unsigned long rec_id;	REC ID
char date[11];	DATE
char time[12];	TIME
int no;	NUMBER
char user_id[USER_ID_SIZE];	USER ID
char prod_id[PROD_ID_SIZE];	PROD ID
floatnet;	NET
float gross	GROSS
float tare;	TARE
intunit;	UNIT
intpoint;	POINT
int stb;	STAB
unsigned char crc;	
}	
alibrecord_str;	

The Alibi memory allows the user to read a maximum of 100,000 records of the latest weighings, understood as data transmission operations via one of the balance's communication interfaces, initiated in weighing mode by the user by pressing the print key or by the automatic print mechanism.
The entire memory can be read by the *Axis Balance Manager program* . The balance should be turned on and connected to the computer using one of the available interfaces: RS-232C, USB (USB Device or USB Serial) or LAN. The balance interface configuration should enable connection to the *Axis Balance Manager program* .

Command initiating the Alibi memory data transfer procedure

Command:

Salibitrn	C.R	LF

Answer:

Malibitrn	C.R	LF

Where:
CR – 0Dh,
LF – 0Ah.

Notes for RS-232C or USB interface case:
- after receiving the balance's response, wait at least 1 second before asking again, because it switches the serial port transmitting to the 115200/8-bit/even mode,
- subsequent queries to the balance should be directed in accordance with the transmission parameters described above.

Alibi memory data header query
Command:

Salibiprn	C.R	LF

Answer:

MODEL:	<model_weights_char[0÷20]>	C.R	LF
S/N :	<serial_number_balances_char[0÷20]>	C.R	LF
PROD.DATE:	<production_date_weights_char[0÷10>	C.R	LF
REC.COUNT:	<number_of_measurements_in_memory_DSD_char[1÷6]>	C.R	LF
REC_ID;DATE;TIME;NUM;USER_ID;PROD_ID;NET;GROSS;TARE;UNIT;POINT;STB		C.R	LF

Request for another Alibi memory record
Command:

Salibinext	C.R	LF

Answer:

REC_ID	;	DATE	;	TIME	;	NUMBER	;	USER_ID	;	PROD_ID	;	NET	;	GROSS	;				

TARE	;	UNIT	;	POINT	;	STB	;	C.R	LF

Where:
REC_ID - char[1÷10], measurement ID, integer 1÷ 4294967295,
DATE - char[9], measurement date in the format YYYY:MM:DD,
TIME - char[8], measurement time in the HH:MM:SS format,
NUM - char[1÷6], print number,
USER_ID - char[0÷8], user ID,
PROD_ID - char[0÷8], product ID,
NET - char[1÷8], net mass without unit,
GROSS - char[1÷8], gross mass without unit,
TARE - char[1÷8], tare without unit,
UNIT - char[3], mass unit for NET, GROSS, TARE fields,
POINT - char[1], number of significant decimal places for NET, GROSS, TARE fields,
STB - char[1], stabilization indicator status.

Comments:
- after sending the last data record, the balance additionally sends:

Malibiprn	C.R	LF

Notes for RS-232C or USB interface case:
- after sending the above sequence, the balance restores the previous settings of the serial port (before the command initiating the memory data transfer procedure).

Query for the last read Alibi memory record (e.g. in case of need for repetition)
Command:

Salibirep	C.R	LF

Answer:
- analogous to point 4.3.

Command to interrupt Alibi memory reading

Command:

Salibistop	C.R	LF

Answer:

Malibistop	C.R	LF

Notes for RS-232C or USB interface case:
- after sending the response, the balance restores the previous settings of the serial port (before the command initiating the DSD memory data transfer procedure).

18 . Detailed information on balance communication

18.1 Detailed description of the LonG data transmission protocol

Transmission parameters: 8 bits, 1 stop bit, no parity, baud rate 4800bps,

Data exchange method:

- Reading the balance indication (corresponds to using the key ⮓ on the balance):
  computer →: **SI** CR LF (53h 49h 0Dh 0Ah) – initialization signal,
  Balance →Computer: balance sends 16 bytes of data as described:

  Byte 1 - "-" or space character
  Byte 2 - space
  Byte 3 ÷4 - digit or space
  Byte 5 ÷9 - digit, comma or space
  Byte 10 - digit
  Byte 11 - space
  Byte 12 - k, l, c, p, o, m, g, d or space
  Byte 13 - g, b, t, c, z, g, r, w or %
  Byte 14 - t or space
  Byte 15 - C.R
  Byte 16 - LF

Note: Entering the balance's network number (*Configuration/Interface/RS Address*) other than zero changes the balance's operation method: computer communication with the balance is possible after logging in the balance with the command: 02h balance_no. Logging out occurs after the command 03h. Using the connector testing program available at www.axis.pl / computer programs , e.g. for balance no. 1 enter: *$0201* , then *SI* , log out: *$03.*

- Inquiry about the presence of the balance in the system (testing the connection between the balance and the computer): Balance
  computer →: **SJ** CR LF (53h 4Ah 0Dh 0Ah),
  Balance →Computer: **MJ** CR LF (4Dh 4Ah 0Dh 0Ah),
- Display of the inscription on the balance display (text message from the computer):
  Computer →Balance: **SN** nn XXXXXX CR LF, nn - display time in seconds; XXXXXX- 6 characters to display
  Balance →Computer: **MN** CR LF (4Dh 4Eh 0Dh 0Ah),
- Taring the balance from the computer (corresponds to using the →T key ←on the balance):

Computer →Balance: **ST** CR LF (53h 54h 0Dh 0Ah), Computer
Balance →: **MT** CR LF (4Dh 54h 0Dh 0Ah),

- Zeroing the balance (corresponds to using the →0 key ←on the balance):
  Computer →Balance: **SZ** CR LF (53h 5Ah 0Dh 0Ah),
  Balance →Computer: **MZ** CR LF (4Dh 5Ah 0Dh 0Ah),
- Turning the balance on/off (corresponds to using the I/ key ⏻on the balance):
  Computer →Balance: **SS** CR LF (53h 53h 0Dh 0Ah),
  Balance →Computer: **MS** CR LF (4Dh 53h 0Dh 0Ah),
- MENU display (corresponds to using the *MENU key* on the balance):
  Computer →Balance: **SF** CR LF (53h 46h 0Dh 0Ah),
  Balance →Computer: **MF** CR LF (4Dh 46h 0Dh 0Ah),
- Setting the threshold value 1 (option):
  Computer →Balance: **SL** *D1...DN* CR LF (53h 4Ch *D1...DN* 0Dh 0Ah)
  where: *D1...DN* – threshold value, maximum 8 characters,
  Balance →Computer: **ML** CR LF (4Dh 4Ch 0Dh 0Ah),
  Example:
  To set 1000g in the B1.5 balance (d=0.5g) enter:
  SL 1 0 0 0 . 0 CR LF (53h 4Ch 31h 30h 30h 30h 2Eh 30h 0Dh 0Ah).
  To set 100kg in the B150 balance (d=50g), enter:
  SL 1 0 0 . 0 0 CR LF (53h 4Ch 31h 30h 30h 2Eh 30h 30h 0Dh 0Ah),
- Setting the threshold value 2 (option):
  Computer →Balance: **SH** *D1...DN* CR LF (53h 48h *D1...DN* 0Dh 0Ah),
  where: *D1...DN* – threshold value, maximum 8 characters,
  Balance →Computer: **MH** CR LF (4Dh 48h 0Dh 0Ah),
- Setting the threshold value 3 - zero (option):
  Computer →Balance: **SM** *D1...DN* CR LF (53h 4Dh *D1...DN* 0Dh 0Ah),
  where: *D1...DN* – threshold value, maximum 8 characters,
  Balance →Computer: **MM** CR LF (4Dh 4Dh 0Dh 0Ah).

18 .2 Detailed description of the EPL data transmission protocol

Transmission parameters: 8 bits, 1 stop bit, no parity, baud rate 9600bps,

- After using the key ⮆ on the balance:

  Balance →Labeling machine: a set of instructions in the EPL-2 language that initiates label printing

US	-	control manual
FR"0001"	-	instruction specifying the label number
?	-	statement starting a list of variable strings
mm:hh	-	5 characters: minutes:hours
yyyy.mm.dd	-	10 characters: year.month.day
mass	-	10 characters: weight indication + weight unit
P1	-	control manual

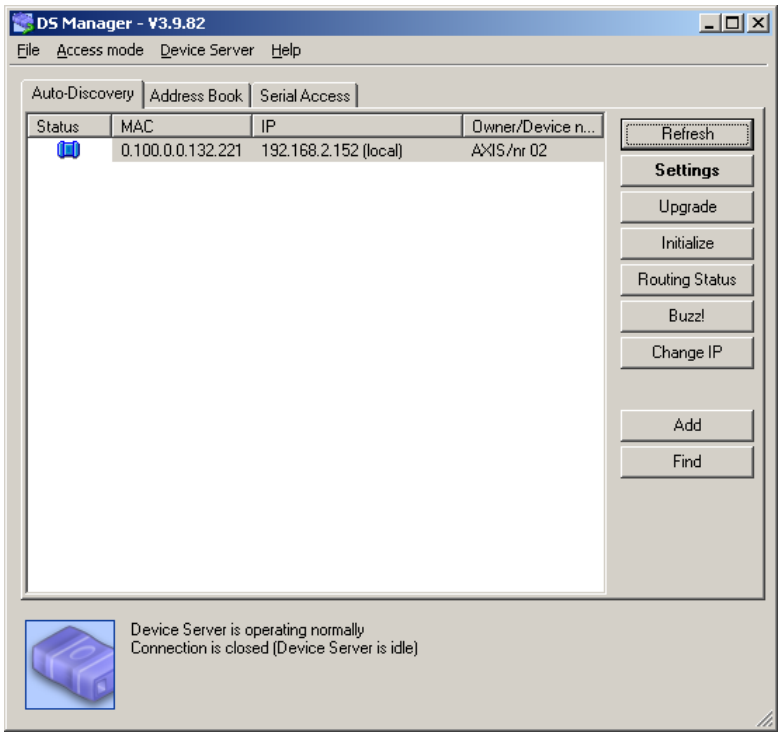
Comments:

1. In addition to variable inscriptions, you can place permanent inscriptions, e.g. the name of the company, product, etc.
2. By default, it is possible to print one label template (number 0001). Using more patterns (different label numbers) is possible thanks to the *LAbEL special function* .
3. To print a label, the labeler must have a label type entered (a label template prepared on the computer and entered into the labeler's memory by the computer). The label form is designed using the ZEBRA DESIGNER program supplied with the labeling machine.
4. The parameters and transmission protocol of the balance must correspond to the type of labeling machine.

18 .3 Configuring the Ethernet module (LAN option)

On balances with a LAN communication port (option), the Tibbo tool package must be installed. To do this, run the installer file TDST_3-9-82.exe. Depending on the package version, the file name may vary.

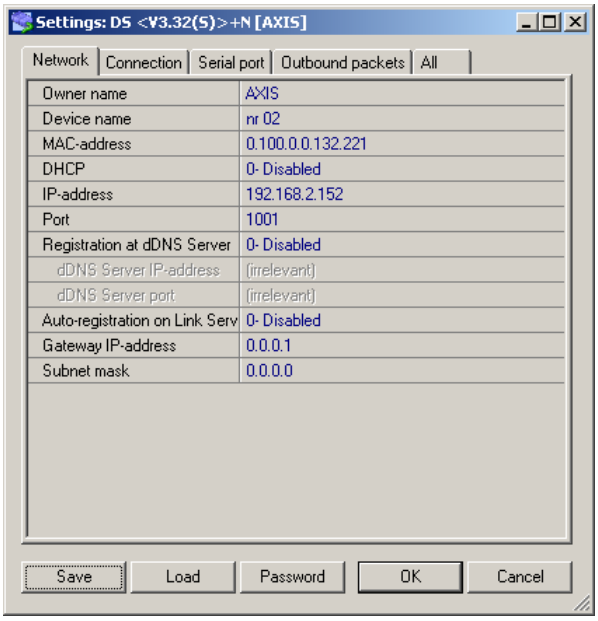
The DS Manager program included in the package is used to configure the Ethernet module. After starting it, it detects all modules connected to the Ethernet network and displays them in the Auto -Discovery window, as shown in the figure below.

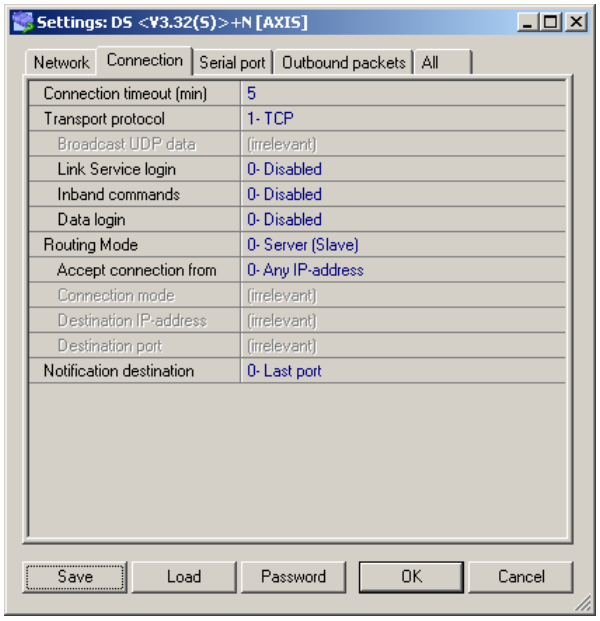


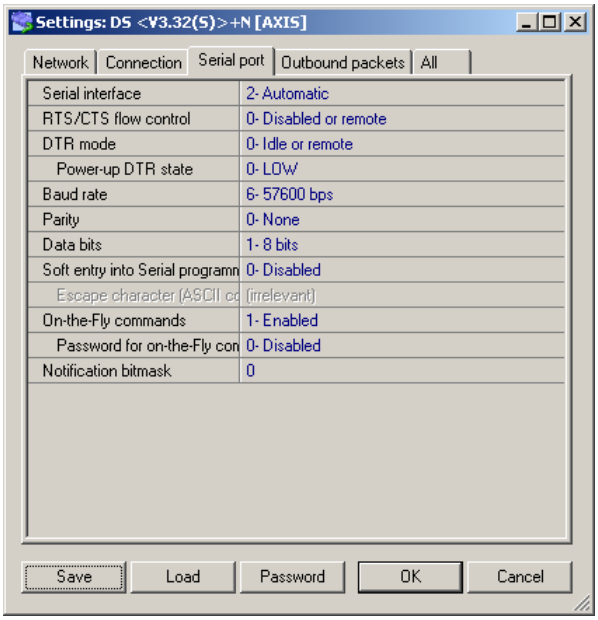
To change the settings, select a given module from the list and click the Settings button. The Settings window, depending on the module version, may differ from the one shown in the drawings.

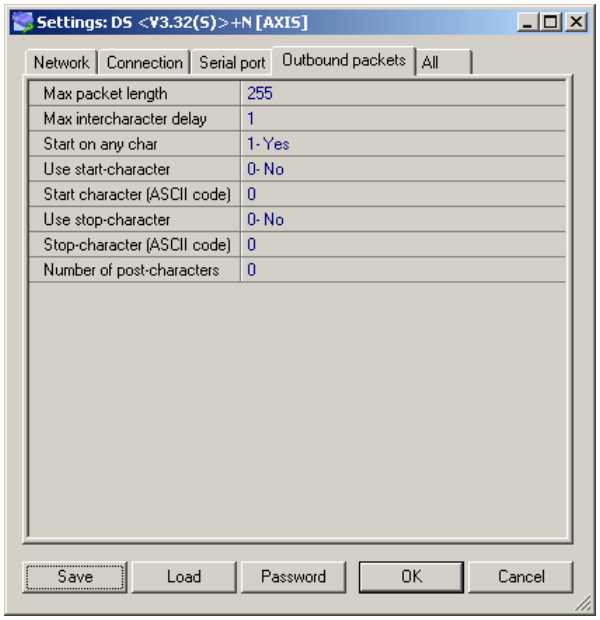
In the Settings window, check and, if necessary, set (as in the pictures): - appropriate transport protocol: TCP by default - IP address: select the address appropriate for the network used - serial port parameters .Series settings).

After setting the parameters, their values are confirmed by clicking OK and possibly confirming the question about restarting the module.


Settings: DS <V3.32(5)>+N [AXIS]
Network
Connection
Serial port
Outbound packets
All
Owner name
AXIS
Device name
nr 02
MAC-address
0.100.0.0.132.221
DHCP
0- Disabled
IP-address
192.168.2.152
Port
1001
Registration at dDNS Server
0- Disabled
dDNS Server IP-address
(irrelevant)
dDNS Server port
(irrelevant)
Auto-registration on Link Serv
0- Disabled
Gateway IP-address
0.0.0.1
Subnet mask
0.0.0.0
Save
Load
Password
OK
Cancel


Settings: DS <V3.32(5)>+N [AXIS]
Network
Connection
Serial port
Outbound packets
All
Connection timeout (min)
5
Transport protocol
1- TCP
Broadcast UDP data
(irrelevant)
Link Service login
0- Disabled
Inband commands
0- Disabled
Data login
0- Disabled
Routing Mode
0- Server (Slave)
Accept connection from
0- Any IP-address
Connection mode
(irrelevant)
Destination IP-address
(irrelevant)
Destination port
(irrelevant)
Notification destination
0- Last port
Save
Load
Password
OK
Cancel


Settings: DS <V3.32(5)>+N [AXIS]
Network
Connection
Serial port
Outbound packets
All
Serial interface
2- Automatic
RTS/CTS flow control
0- Disabled or remote
DTR mode
0- Idle or remote
Power-up DTR state
0- LOW
Baud rate
6- 57600 bps
Parity
0- None
Data bits
1- 8 bits
Soft entry into Serial programn
0- Disabled
Escape character (ASCII co
(irrelevant)
On-the-Fly commands
1- Enabled
Password for on-the-Fly con
0- Disabled
Notification bitmask
0
Save
Load
Password
OK
Cancel


Settings: DS <V3.32(5)>+N [AXIS]
Network
Connection
Serial port
Outbound packets
All
Max packet length
255
Max intercharacter delay
1
Start on any char
1- Yes
Use start-character
0- No
Start character (ASCII code)
0
Use stop-character
0- No
Stop-character (ASCII code)
0
Number of post-characters
0
Save
Load
Password
OK
Cancel

19 . Maintenance and removal of minor damage

1. Keep the balance clean.
2. Be careful not to let any dirt get between the pan and the housing while using the balance. If contamination is found, remove the pan (by lifting it up), remove the contamination, and then replace the pan.
3. In the event of incorrect operation caused by a short-term power outage, turn the balance off by removing the power plug from the socket, and then turn it on again after a few seconds.
4. Any repairs to the balance should be performed by an authorized service center.
5. To repair the balance, please contact the nearest service point.
6. Damaged balances can only be sent for repair via courier in the original packaging, otherwise there is a risk of damage to the balance and loss of warranty.

Emergency messages

Announcement	Cause	Recommendation
"Test ..."	self-tests in progress / damage to the balance's electronic system	wait approx. 1 minute,
" - - - - "	balance zeroing not completed / mechanical damage to the balance	wait approx. 1 minute check whether the balance is stable and free from vibrations
"Internal calibration: load error"	underload or overload of the balance mechanism / mechanical damage	check whether all pan elements are placed or whether no load has been left on the balance
"Tare range exceeded"	taring attempt during zero indication	balance indications must be different from zero
"Zeroing range exceeded"	permissible zeroing range exceeded	remove the load from the balance
"Weight range exceeded"	permissible weight range exceeded (Max +9*e)	reduce weight load
"Measuring range exceeded (+)"	exceeding the upper measurement range of the analog-to-digital converter	take off the load
"Measuring range exceeded (-)"	exceeding the lower measurement range of the analog-to-digital converter	check whether all pan elements are placed
"Unit weight too low"	an attempt to enter too small a unit weight	the weight of a single element is too low or too many pieces have been entered

If the message persists, contact an authorized service center.

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