USER MANUAL

APN SERIES

File: 2024-06-03 APN APE _gb

Content:

1. Introduction

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

SPEEd 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. In particular, when *FASt. is selected* balance can be used to weigh very small portions of mass.

The balances can be equipped with a non-removable memory of DSD weighing results (Alibi memory) in accordance with the PN-EN 45501 standard. The method of using the memory is described in Appendix A.

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

Legalization (conformity assessment) of scales is required for specific applications listed in the MGP and PS Regulation of December 11, 2003 (trade, tariffs, pharmacy recipes, medical and pharmaceutical analyses, packaging of goods and others).

Verified scales comply with EU type approval certificate and have the following verification and security features:

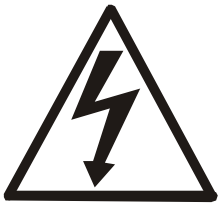
- metrological mark M on the company plate,
- number of the notified body on the company plate,
- security stickers placed on: the edge of the company plate, on the screw securing the scale cover and in the place of access to the adjustment switch.

2. Set

The basic set includes:

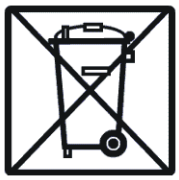
1. balance,
2. sheet metal floor of the weighing chamber and anti-draft ring surrounding the weighing pan,
3. Pan base and pan,
4. Power supply 12V / 1.2A,
5. User manual,
6. Guarantee.

3. Safety rules



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

- Repairs and necessary adjustments to the scale 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 scale) and the supply voltage must comply with the technical data.
- Do not use the scale with part of the housing removed.
- Do not use the scale in an explosive atmosphere.
- Do not use the scale in places with high humidity.
- If you suspect damage to the scale, turn it off and do not use it until it is checked by a specialized service.



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

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

4. Technical data

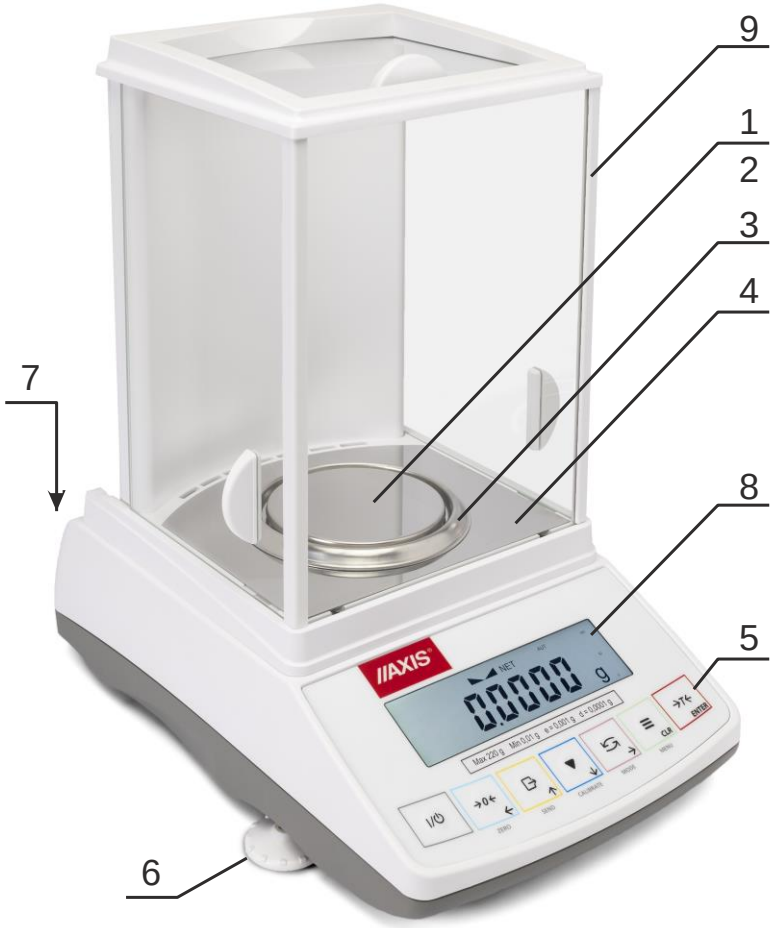
Technical data			
Balances with int. calib.	**APN120**	**APN220**	**APN320**
Balances without int. calib.	**APE120**	**APE220**	**APE320**
Capacity (Max)	120g	220g	320g
Reading unit (d)	0,1mg	0,1mg	0,1mg
Verification unit (e)	1mg	1mg	1mg
Tare range	-120g	-220g	-320g
Accuracy class	I		
Repeatibility	0,1mg		
Linearity	±0,2mg		
Working temperature	+18 ÷ +38°C		
Weighing time	<5s		
Units	mg, g, ct, lb, oz, ozt, gr, dwt		
Display	backlighted LCD, digits height 18mm		
Interfaces	RS232, USB_A, USB_B options: LAN, Wi-Fi		
Pan size	ϕ90mm		
Dimensions (with legs)	234x345x356mm		
Draft shield dimensions	174x135x220mm		
Power supply	~230V 50Hz 6VA / =12V 1,2A		
Balance weight	5,2kg		
Recommended std. of mass	E2 100g	E2 200g	

Balances with verification option M

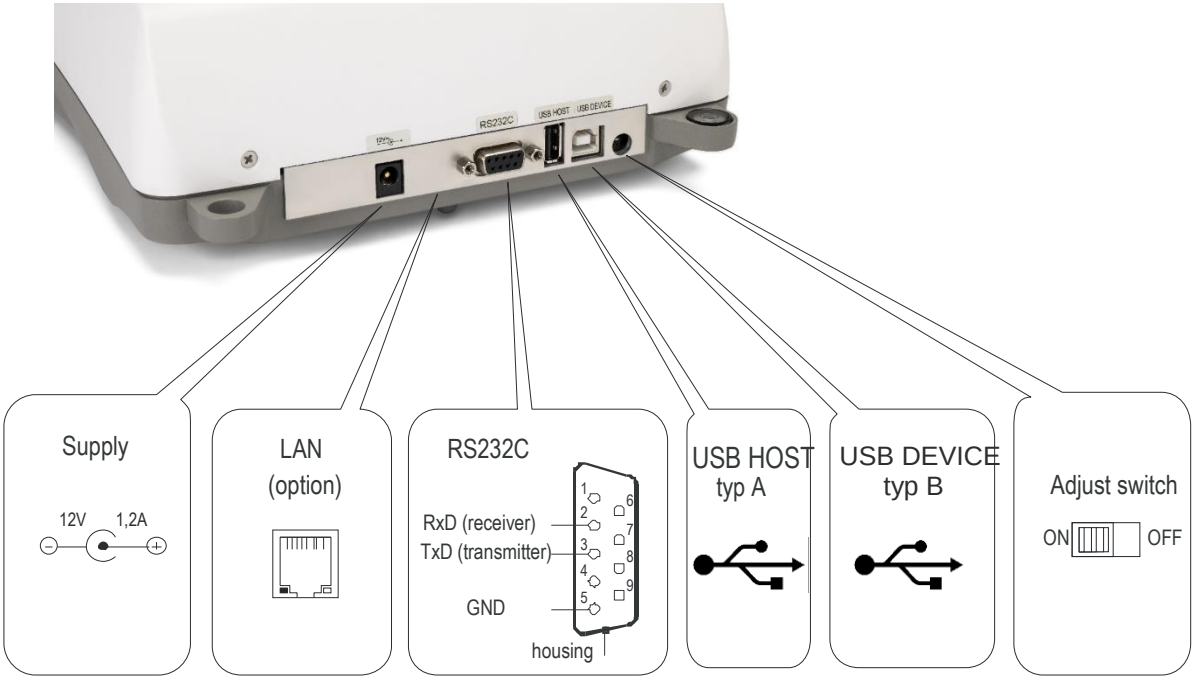
Attention:
E2 - this is the international designation of the class of mass standards according to OIML. The class involves requirements regarding the accuracy of the standards.

5. General description of the scale

Scale view



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

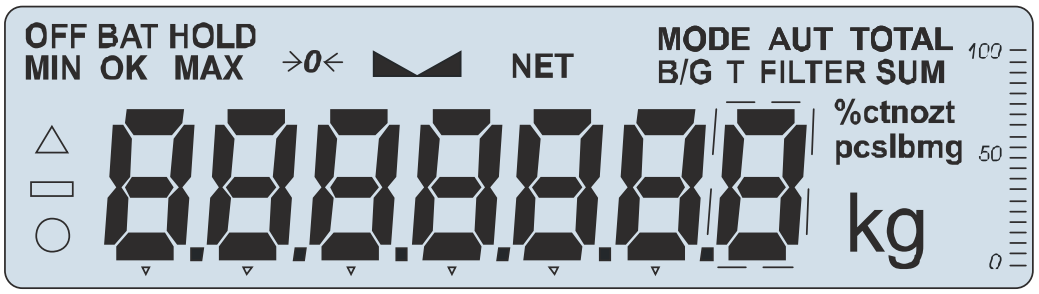


6. Weight keys and indicators

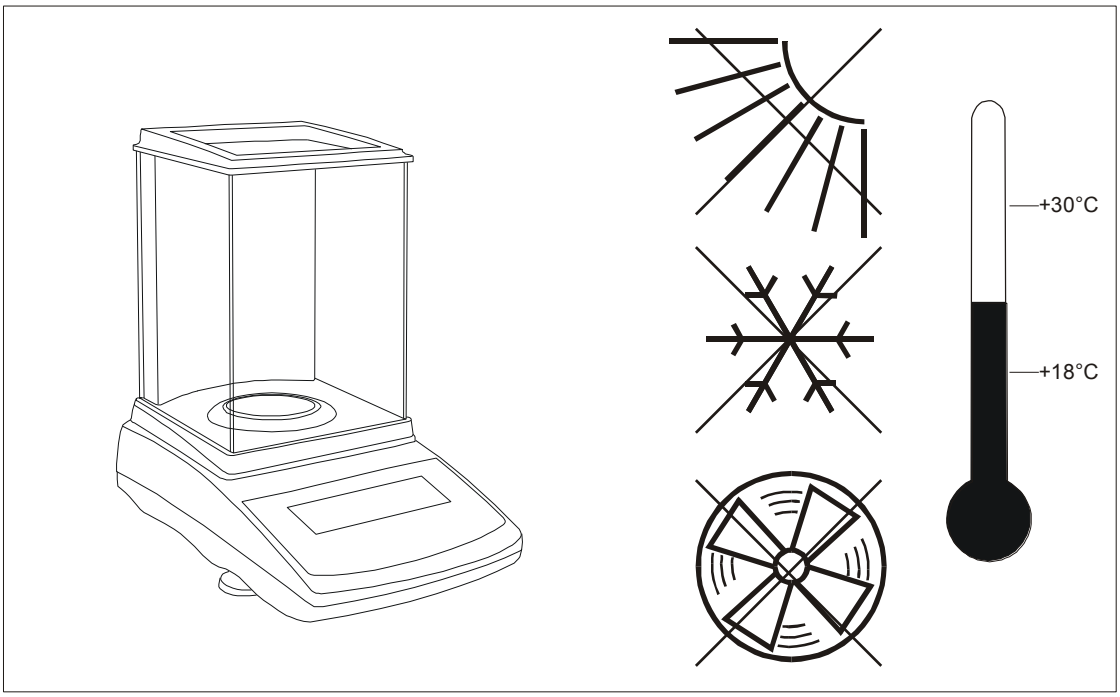
Basic key functions

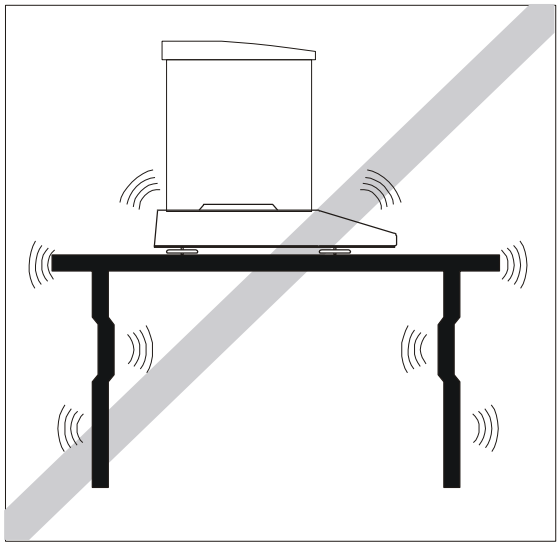
→T← / ENTER	-	taring (entering the mass subtracted from the weighed mass) / confirmation (selection of options),
≡/ CLR / MENU	-	entering the menu / undoing the last selection, deleting / interrupting auto-calibration / long press: Product ID
// →MODE	-	switching the scale's operating mode / navigation key (right) / changing the mode / long press: User ID (login),
/ ↓ / CALIBRATE	-	internal calibration / navigation key (down) / external calibration,
→0 ←/ ←/ ZERO	-	zeroing (only scales for direct billing) / navigation key (left),
/↑/ SEND	-	printing (transmission) of the result / long press displays the print menu / transmission options (SEND),
And /	-	on/off switch (standby),

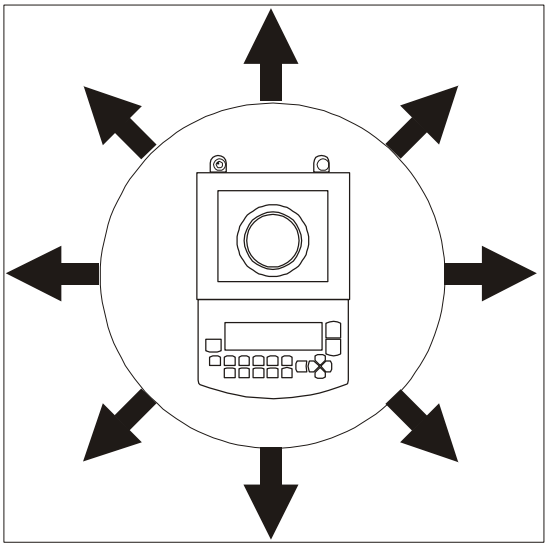
Full set of weight indicators displayed



7. Preparing the balance's workplace

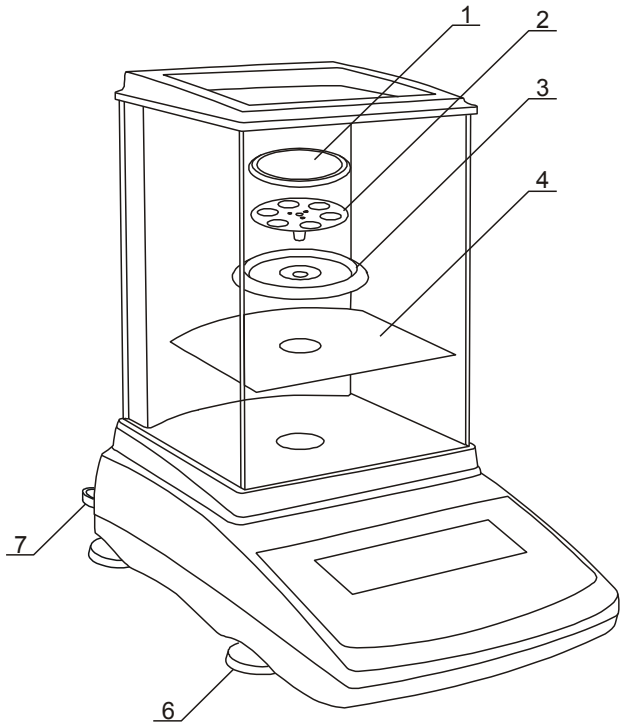






The scale's operating location should be selected carefully to limit the influence of factors that may disturb its operation. This place must ensure the appropriate operating temperature of the scale and the necessary space for its operation. The scale should be placed on a stable table made of a material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

8. Preparing the scale for work



1. Remove the scale and the boxes containing the power supply and the mechanical components of the weighing pan from the carton. It is recommended to keep the original packaging for future transport.
2. Place the scale on a stable surface in a place not exposed to mechanical vibrations and air movements.
3. Assemble the glass elements according to the detailed drawings included in the box.
4. Place the sheet metal floor *on the 4th* weighing chamber.
5. Put on ring *3* to protect the pan against impact from the side.
6. Gently insert the pin of the support pan *2* into the hole in the scale mechanism and put on the pan cover *1*.
7. Set the weight level using the swivel feet *6* so that the air bubble in the level *7*, located at the back of the scale, is in the middle position.

8. Take the power supply out of the box, connect the power supply plug to the 12V socket on the back of the scale.

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 power as it may damage the scale or cause it to malfunction. Before turning on the balance, leave it for approximately 4 hours to acclimatize in the room where the scale will be used.

9. Plug the power supply into the 230V mains socket.

Turning on the scale with an unloaded pan will perform self-tests and internal calibration. The scale is ready for weighing after displaying the zero reading.

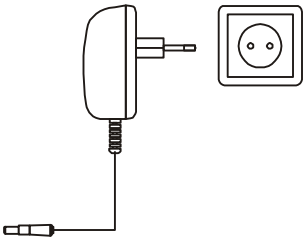
9. General operating rules

Do not overload the device beyond 20% of the maximum load. It is unacceptable to press the pan with your hand.

During transport, remove the pan (lift it gently) and the base of the pan (lift it up) and protect them against damage.

1. The weighed mass should be placed in the center of the pan.
2. The weighing result should be read when the " " indicator is lit ▬, signaling that the result has stabilized.
3. The balance allows taring over the entire measuring range. This is done by pressing the →*T key* ←. Taring does not extend the measurement range, but only subtracts the tare from the mass on the balance pan. In order to facilitate control of the weight on the pan and avoid exceeding the range, the balance has a load indicator scaled from 0 ÷to 100% Max.
4. Before placing the weighed mass, check whether the zero indicator " →0 ←" is displayed. If not, press the →*0 key* ←and wait until the scale resets to zero and the zero indicator appears. Only then can a charge be imposed.
5. When you are not weighing but the scale is ready for operation, you can turn the scale off by pressing *the I / key* ⏻. This will turn off the backlight of the scale's reading system and move to the so-called a standby state in which the scale maintains its internal temperature and the ability to start measuring with maximum accuracy. The ready state is indicated by the *OFF indicator* . The scale is turned on by pressing *the I / key* ⏻.
6. The scale cannot be used to weigh ferromagnetic materials due to the influence of changes in the magnetic field in the scale's surroundings on the measurement accuracy.
7. The scale mechanism is a precision device sensitive to mechanical impacts and shocks, as well as changes in air temperature and humidity.
8. After each change of location of the scale, it should be leveled and internal calibration should be performed using the key ▼ .

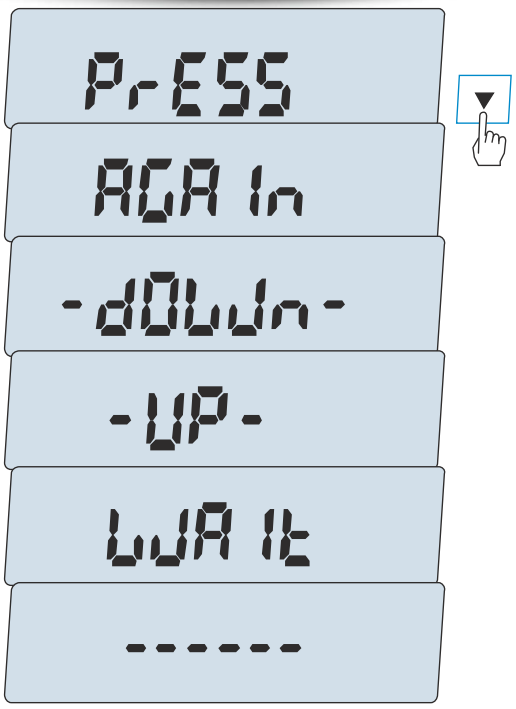
1 0. Start the scale



Plug the power supply into the ~230 V mains socket , and then, with the weighing pan unloaded, insert the power supply plug into the scale's 12V socket.

This will perform self-tests and reset the scale to zero.

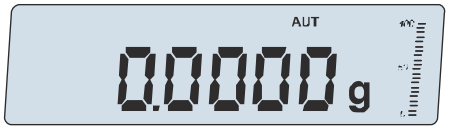
Self-test of the scale display (self-tests of the internal electronic components C1 ÷8 are only displayed if the test result is negative).



After displaying the firmware version, the scale proceeds to automatic calibration.

Internal calibration takes approximately 60 seconds (calibration can be interrupted by pressing *the CLR key* , which is confirmed by the message *CAL End*).

~60 sekund

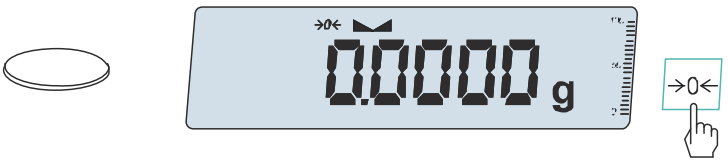


After displaying the zero indication, the scale is ready for operation.

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

1 1. Weighing with taring

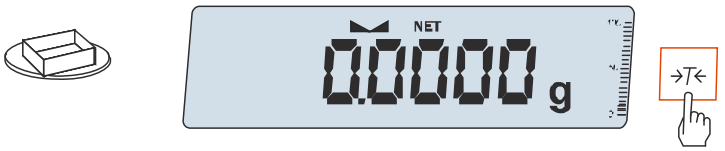
In order to place or remove the load, the right, left or upper glass pane must be moved aside. The results should be read with the building closed.



0 ←indicator is not displayed when the scale is unloaded →, reset the scale to zero using the *→0 key ←*.

Zero indication and indicator on *→0←* indicate readiness for weighing.

Put on the container (packaging).



T ←key→ .

The scale will indicate zero and the NET indicator will appear.

Place the item to be weighed and read the net weight (the NET indicator indicates that the scale indicates net weight).

To read the gross mass, press the key ⇆(the B/G indicator indicates that the scale indicates the gross mass). Reusing a key ⇆ returns to net weight.

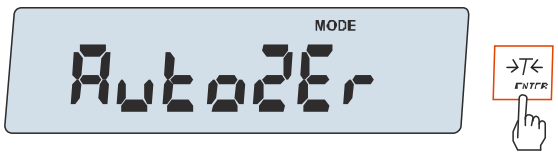
1 2. Principles of menu navigation

In addition to the basic weighing function, the scales have utility functions and configuration options that enable changing the standard settings of the scale program according to the user's needs. These settings concern logging in, authorization system, method of printing measurement results, language selection, etc. The configuration options are collected in the *SEtUP directory* . A special configuration option is the *Menu option* , which allows the User to select several of the numerous utility functions and thus create their own working menu, which will be available directly after pressing the MENU key.

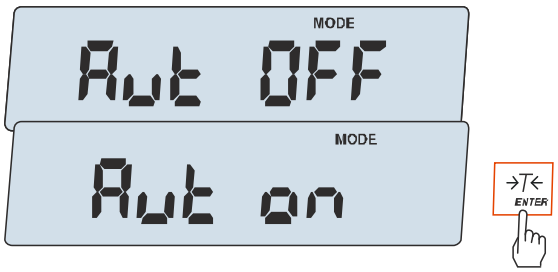
The method of creating the work menu is described in Chapter 17. The basic operations performed using the scale keys are described below.

Selecting a menu item:

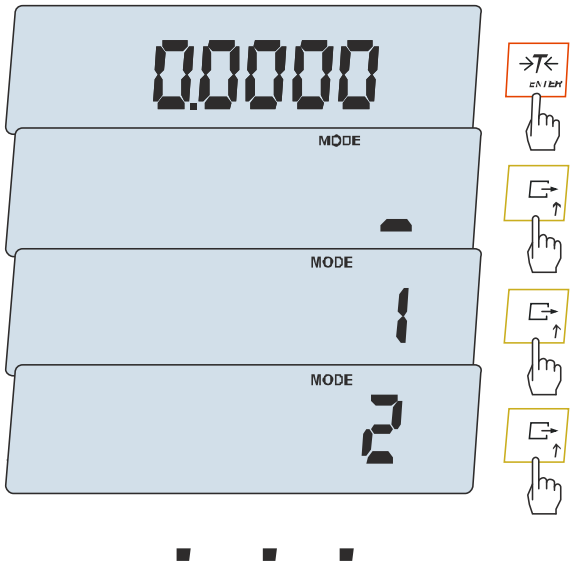
The first menu item appears after pressing the *Menu key* . This item is displayed for approx. 4 seconds, and then the scale starts automatically displaying subsequent menu items.



A menu item is selected by pressing the *ENTER key* while its name abbreviation is displayed.



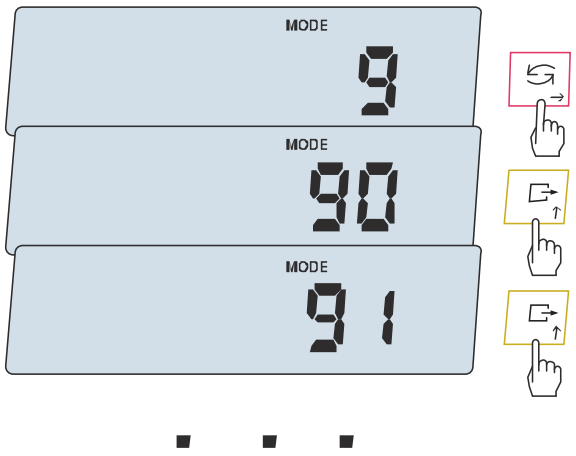
After selecting a menu item, sub-options appear:
on – means enabling the selected menu item,
OFF - turns it off,
out - exit to the previous menu level.



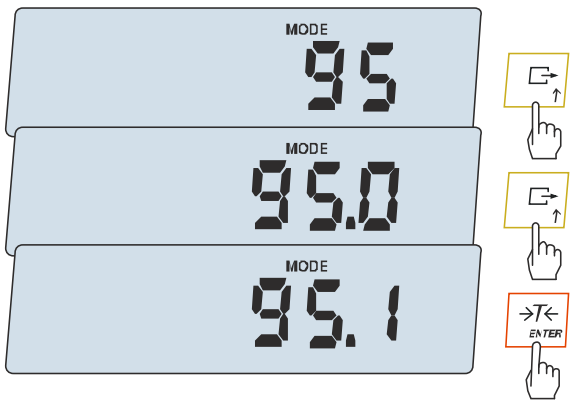
Entering numerical values:

Entering numerical values is necessary when using some special functions, e.g. the *thr function* requires entering threshold values.
When prompted with the _ **character,** use the keys:

↑ - increasing the value of the entered digit (longer press - decimal point),

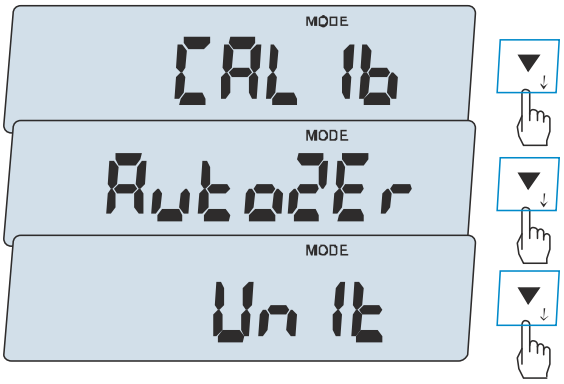


→ - move to the next digital position,



~3 s. ↑ - long press - decimal point,

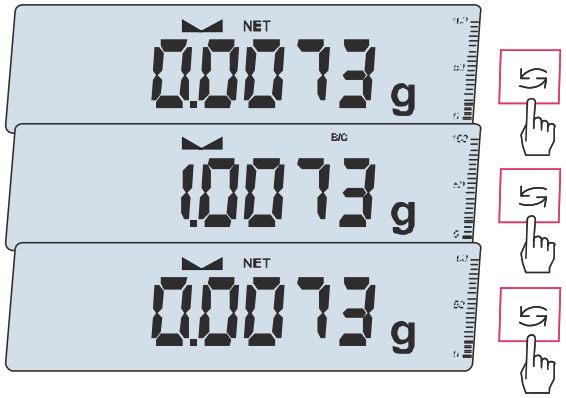
ENTER - end of typing **.**



Speeding up work with the menu:

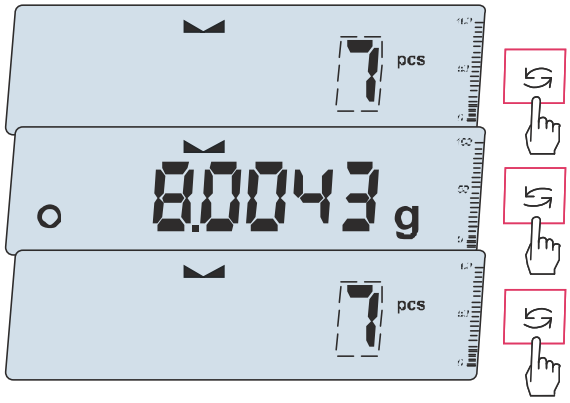
The first item of each menu level is displayed for approx. 4 seconds. During this time, the User can scroll through subsequent items using the key↓ without waiting for the automatic display of abbreviated item names.

To immediately return to the previous menu level, use the ←or *Menu key* .



Key operation principle ⮌*:*

During standard weighing, the key⮌ is used to switch from net to gross weight indications (in the drawing on the right, tare = 1.0000g).

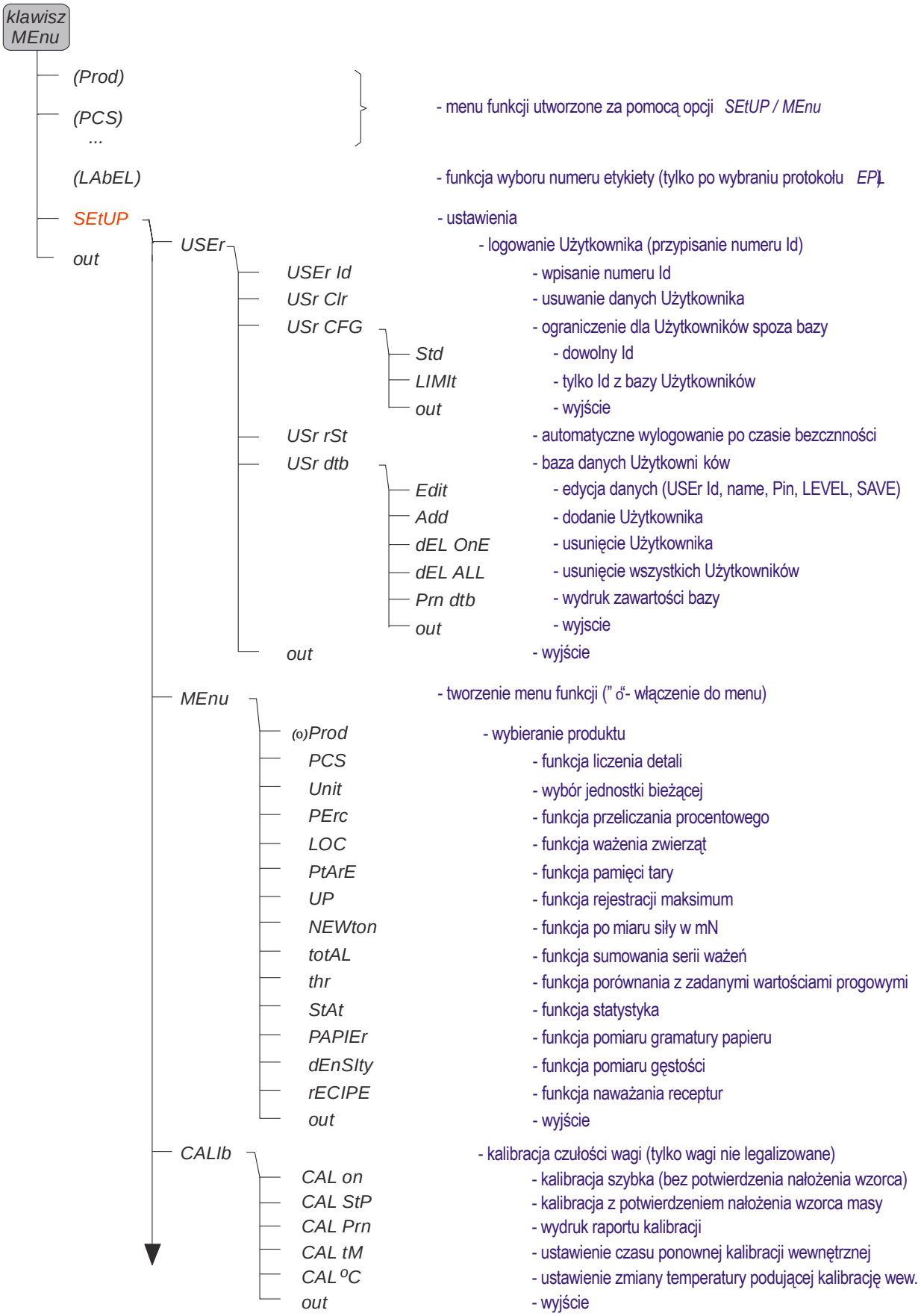


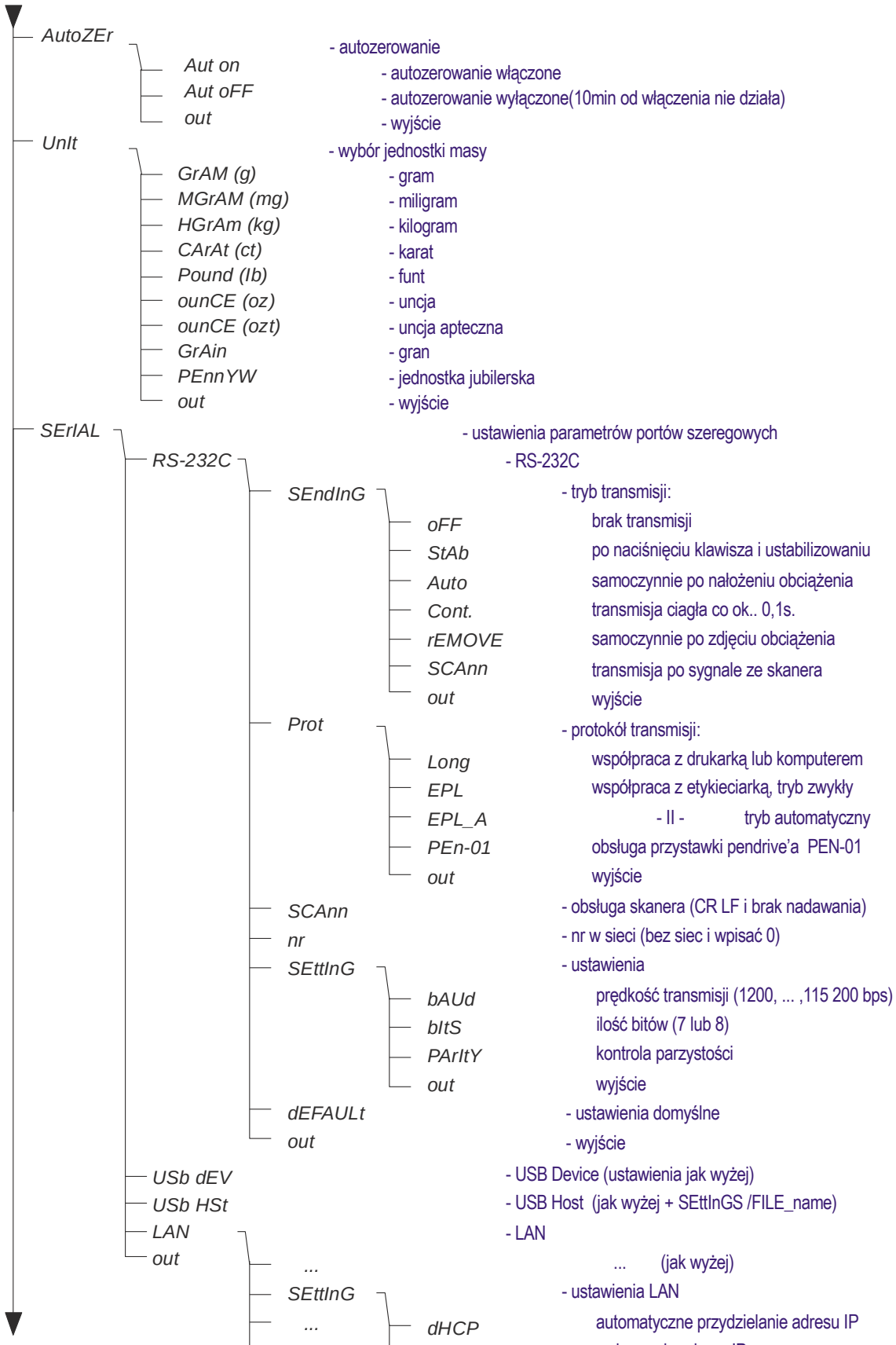
During special functions, e.g. *PCS* , use the key ⮌ enables immediate return to standard weight indication .

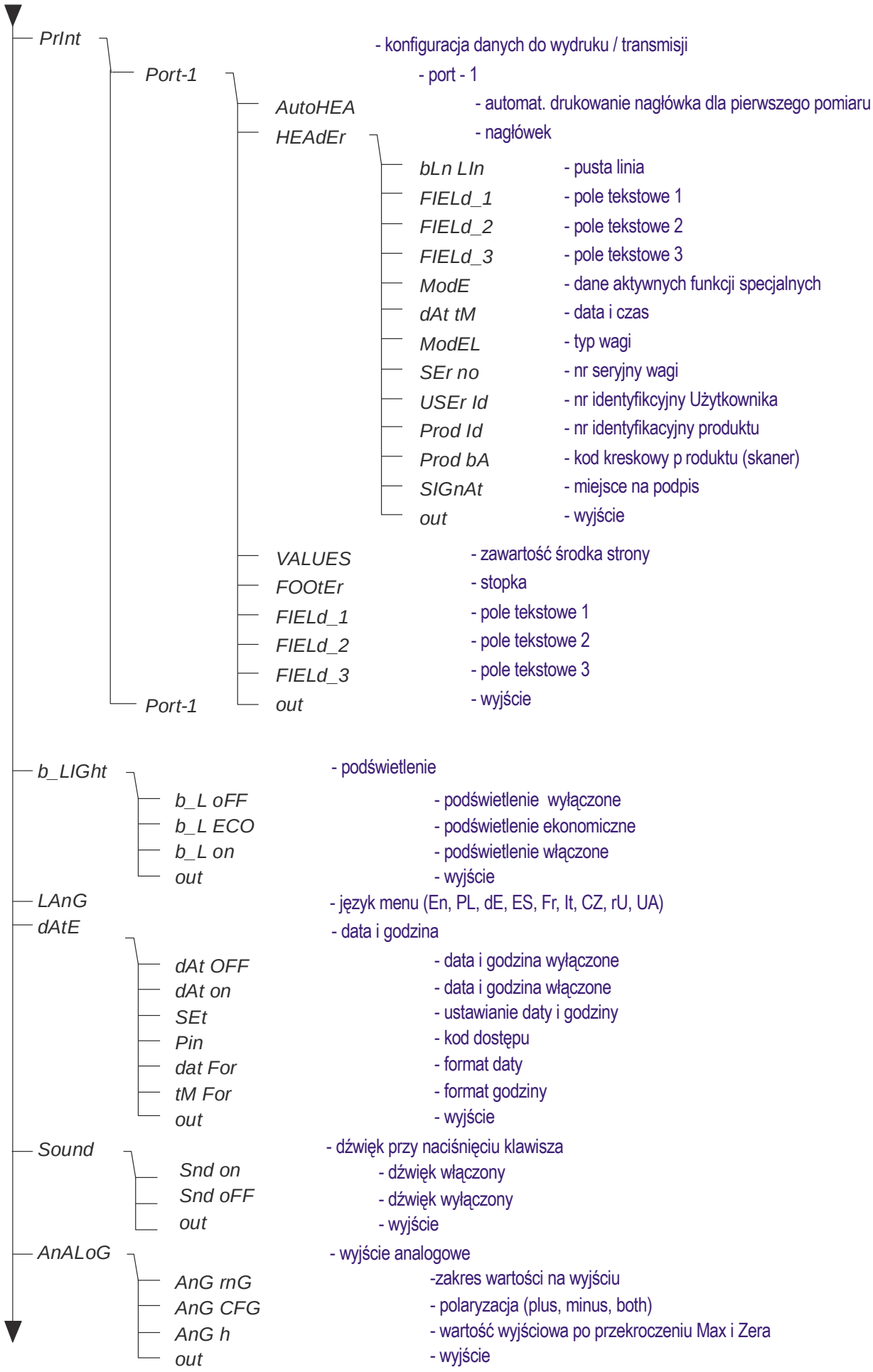
The "o" sign on the left indicates that a special function has been turned on and the possibility of returning to it using the key ⮌.

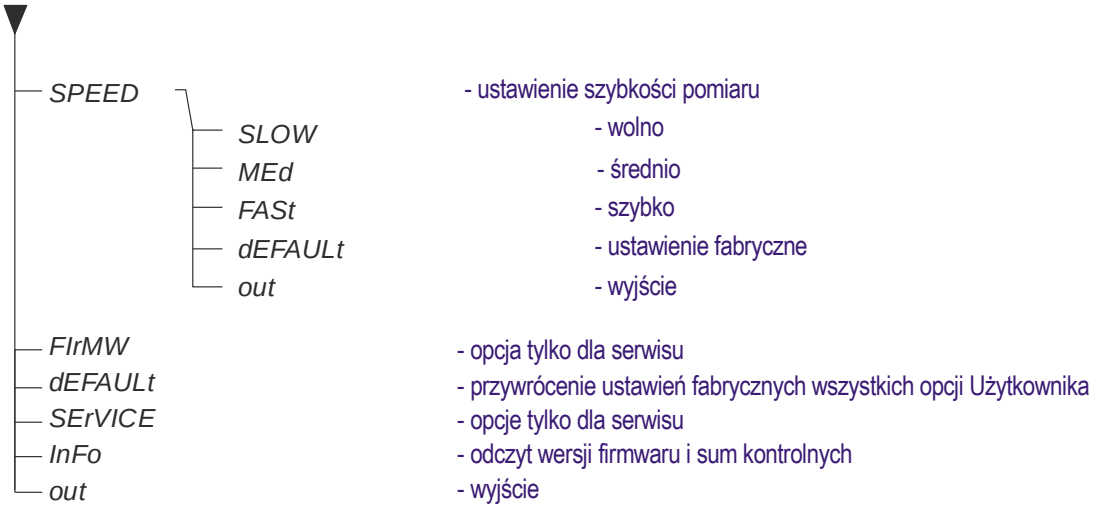
It is recommended to use the diagram when using the menu.

1 3. Diagram of the scale settings menu




AutoZEr
- autozerowanie
Aut on
- autozerowanie włączone
Aut oFF
- autozerowanie wyłączone(10min od włączenia nie działa)
out
- wyjście
UnIt
- wybór jednostki masy
GrAM (g)
- gram
MGrAM (mg)
- miligram
HGrAm (kg)
- kilogram
CArAt (ct)
- karat
Pound (Ib)
- funt
ounCE (oz)
- uncja
ounCE (ozt)
- uncja apteczna
GrAin
- gran
PEnnYW
- jednostka jubilerska
out
- wyjście
SErIAL
- ustawienia parametrów portów szeregowych
RS-232C
- RS-232C
SEndInG
- tryb transmisji:
oFF
brak transmisji
StAb
po naciśnięciu klawisza i ustabilizowaniu
Auto
samoczynnie po nałożeniu obciążenia
Cont.
transmisja ciagła co ok.. 0,1s.
rEMOVE
samoczynnie po zdjęciu obciążenia
SCAnn
transmisja po sygnale ze skanera
out
wyjście
Prot
- protokół transmisji:
Long
współpraca z drukarką lub komputerem
EPL
współpraca z etykieciarką, tryb zwykły
EPL_A
- II - tryb automatyczny
PEn-01
obsługa przystawki pendrive'a PEN-01
out
wyjście
SCAnn
- obsługa skanera (CR LF i brak nadawania)
nr
- nr w sieci (bez siec i wpisać 0)
SEttInG
- ustawienia
bAUd
prędkość transmisji (1200, ... ,115 200 bps)
bItS
ilość bitów (7 lub 8)
PArItY
kontrola parzystości
out
wyjście
dEFAULt
- ustawienia domyślne
out
- wyjście
USb dEV
- USB Device (ustawienia jak wyżej)
USb HSt
- USB Host (jak wyżej + SEttInGS /FILE_name)
LAN
- LAN
out
...
... (jak wyżej)
SEttInG
- ustawienia LAN
...
dHCP
automatyczne przydzielanie adresu IP
out
IP
wpisywanie adresu IP
GAtEW
wpisywanie adresu bramy
MASK
wpisywanie maski podsieci
ModE
wybór trybu: Client / Server
Port
wpisywanie numeru portu serwera
out
wyjście


PrInt
- konfiguracja danych do wydruku / transmisji
Port-1
- port - 1
AutoHEA
- automat. drukowanie nagłówka dla pierwszego pomiaru
HEAdEr
- nagłówek
bLn LIn - pusta linia
FIELd_1 - pole tekstowe 1
FIELd_2 - pole tekstowe 2
FIELd_3 - pole tekstowe 3
ModE - dane aktywnych funkcji specjalnych
dAt tM - data i czas
ModEL - typ wagi
SEr no - nr seryjny wagi
USEr Id - nr identyfikcyjny Użytkownika
Prod Id - nr identyfikacyjny produktu
Prod bA - kod kreskowy p roduktu (skaner)
SIGnAt - miejsce na podpis
out - wyjście
VALUES - zawartość środka strony
FOOtEr - stopka
FIELd_1 - pole tekstowe 1
FIELd_2 - pole tekstowe 2
FIELd_3 - pole tekstowe 3
Port-1
out - wyjście
b_LIGht
- podświetlenie
b_L oFF - podświetlenie wyłączone
b_L ECO - podświetlenie ekonomiczne
b_L on - podświetlenie włączone
out - wyjście
LAnG
- język menu (En, PL, dE, ES, Fr, It, CZ, rU, UA)
dAtE
- data i godzina
dAt OFF - data i godzina wyłączone
dAt on - data i godzina włączone
SEt - ustawianie daty i godziny
Pin - kod dostępu
dat For - format daty
tM For - format godziny
out - wyjście
Sound
- dźwięk przy naciśnięciu klawisza
Snd on - dźwięk włączony
Snd oFF - dźwięk wyłączony
out - wyjście
AnALoG
- wyjście analogowe
AnG rnG -zakres wartości na wyjściu
AnG CFG - polaryzacja (plus, minus, both)
AnG h - wartość wyjściowa po przekroczeniu Max i Zera
out - wyjście


SPEED
- ustawienie szybkości pomiaru
SLOW
- wolno
MEd
- średnio
FASt
- szybko
dEFAULt
- ustawienie fabryczne
out
- wyjście
FIrMW
- opcja tylko dla serwisu
dEFAULt
- przywrócenie ustawień fabrycznych wszystkich opcji Użytkownika
SErVICE
- opcje tylko dla serwisu
InFo
- odczyt wersji firmwaru i sum kontrolnych
out
- wyjście

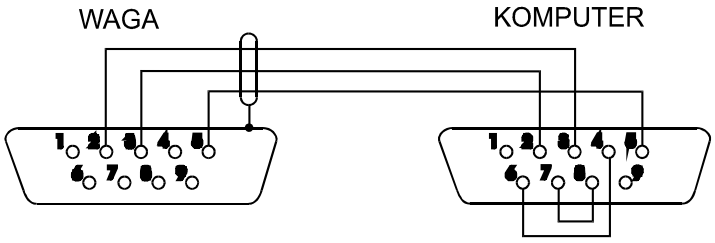
1 4. Checking the weight

During operation of the scale, 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 scale is stable and level,
- the scale 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 scale when it is disconnected from the power supply; in such a case, leave the scale switched on for a few minutes to equalize its internal temperature.
If none of the above-mentioned causes of inaccuracy occur, the scale 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 scales, 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 given in section 17.1.

15. Connection to a computer, printer or labeling machine

In order to transmit data to external devices, the scale is equipped with an RS232C serial connector **.**
When used with a computer, the scale transmits the weighing result following an initial signal from the computer or after pressing a key ⮕ on the scale.
When used with a printer, data can be sent automatically after applying the sample and stabilizing the scale readings, with the next transmission possible after removing the sample.
When working with a labeling machine, after pressing a key, ⮕ the scale 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 .

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



The cable connecting the scale 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

The method of sending data and the transmission parameters are set using the *SErIAL special function* .
The set of data to be sent is determined using the *PrInt special function* .
The following data can be sent:
- header (scale 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*).

If the scale is equipped with two serial connectors, the *Print function data* is set independently for both connectors.
If the scale works with a computer, the computer must have a program that allows processing data from the scale. Such programs are available from the scale manufacturer.
In addition to the RS232C connector, the scale can be equipped with a USB or Wi-Fi connector. The necessary drivers and installation instructions can be found at www.axis.pl.

15.1 Detailed description of the LonG data transmission protocol

Default transmission parameters (*dEFAULt*): 8 bits, 1 stop bit, no parity, baud rate 9600bps,

Data exchange method:

- Reading the scale indication (corresponds to using the key ⮆ on the scale):
  computer →: **SI** CR LF (53h 49h 0Dh 0Ah) – initialization signal,
  Scale →Computer: scale 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 scale's network number (*SErIAL/no* .) other than zero changes the scale's operation method: computer communication with the scale is possible after logging in the scale with the command: 02h scale_no. Logging out occurs after the command 03h. Using the connector testing program available at www.axis.pl / computer programs , e.g. for scale no. 1 enter: *$0201* , then *SI* , log out: *$03.*

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

- Taring the scale from the computer (corresponds to using the →T key ←on the scale):
  Computer →Scale: **ST** CR LF (53h 54h 0Dh 0Ah), Computer
  Scale →: **MT** CR LF (4Dh 54h 0Dh 0Ah),
- Zeroing the scale (corresponds to using the →0 key ←on the scale):
  Computer →Scale: **SZ** CR LF (53h 5Ah 0Dh 0Ah),
  Scale →Computer: **MZ** CR LF (4Dh 5Ah 0Dh 0Ah),
- Turning the scale on/off (corresponds to using the I/ key ⏻on the scale):
  Computer →Scale: **SS** CR LF (53h 53h 0Dh 0Ah),
  Scale →Computer: **MS** CR LF (4Dh 53h 0Dh 0Ah),
- MENU display (corresponds to using the *MENU key* on the scale):
  Computer →Scale: **SF** CR LF (53h 46h 0Dh 0Ah),
  Scale →Computer: **MF** CR LF (4Dh 46h 0Dh 0Ah),
- Setting the threshold value 1 (option):
  Computer →Scale: **SL** *D1...DN* CR LF (53h 4Ch *D1...DN* 0Dh 0Ah)
  where: *D1...DN* – threshold value, maximum 8 characters,
  Scale →Computer: **ML** CR LF (4Dh 4Ch 0Dh 0Ah),
  Example:
  To set 1000g in the B1.5 scale (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 scale (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 →Scale: **SH** *D1...DN* CR LF (53h 48h *D1...DN* 0Dh 0Ah),
  where: *D1...DN* – threshold value, maximum 8 characters,
  Scale →Computer: **MH** CR LF (4Dh 48h 0Dh 0Ah),
- Setting the threshold value 3 - zero (option):
  Computer →Scale: **SM** *D1...DN* CR LF (53h 4Dh *D1...DN* 0Dh 0Ah),
  where: *D1...DN* – threshold value, maximum 8 characters,
  Scale →Computer: **MM** CR LF (4Dh 4Dh 0Dh 0Ah).

1 5.2 Detailed description of the EPL data transmission protocol

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

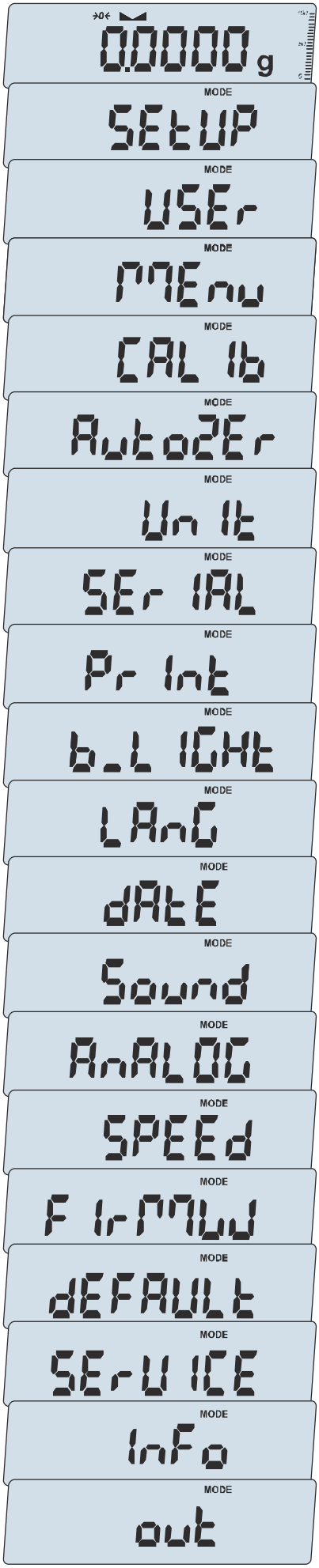
- After using the key ⮆ on the scale:

  Scale →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
?	-	an instruction that begins a list of variable strings
mm:hh	-	5 characters: minutes :hours
yyyy.mm.dd	-	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 obtain a label printout, the labeller must have the form of the label 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 scale must correspond to the type of labeling machine.



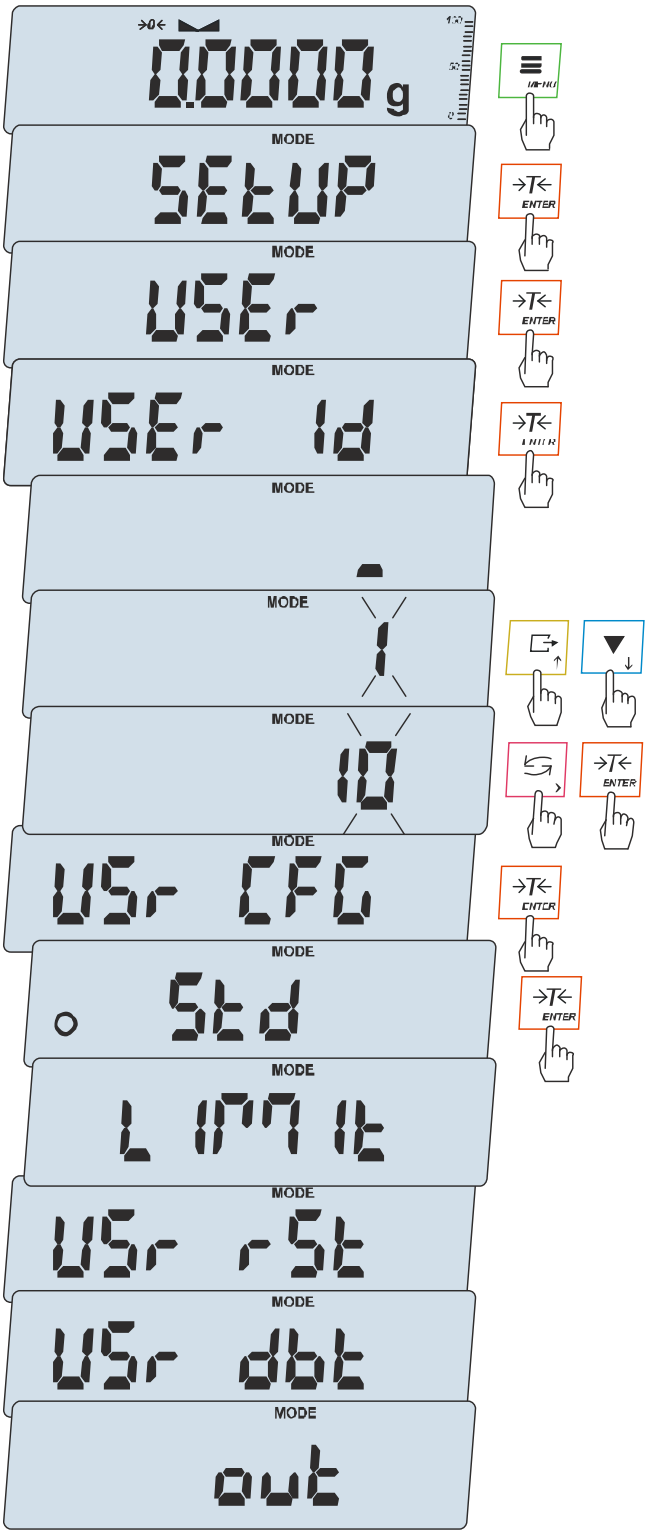
16. Scale settings (SEtUP)

SEtUP contains options for setting the scale operation method:

- *USEr* – User login
- *MEnu* – creating your own User menu
- *CALIb* – scale sensitivity calibration
- *AutoZEr* – automatic maintenance of the zero indication of the unloaded scale
- *UnIt* – selection of mass unit
- *SErIAL* – setting serial ports
- *Print* – selection of data for transmission (printing)
- *b_LIGHT* – display backlight
- *LAnG* – language selection (printouts)
- *dAtE* – setting the current date and time
- *Sound* – sound when pressing a key
- *AnALoG* – setting the analog output (option)
- *SPEEd* – selection of weighing speed,
- *FirMW(are)* – service option, unavailable to the User
- *dEFAULt* – return to factory settings
- *SErVICE* – service menu, unavailable to the User
- *InFo* – displaying the version of the scale program and checksums
- *Out* – exit from *the SEtUP option*

The option is enabled by pressing the *ENTER key* while its name abbreviation is displayed.

1 6.1 Login , User database (USEr)

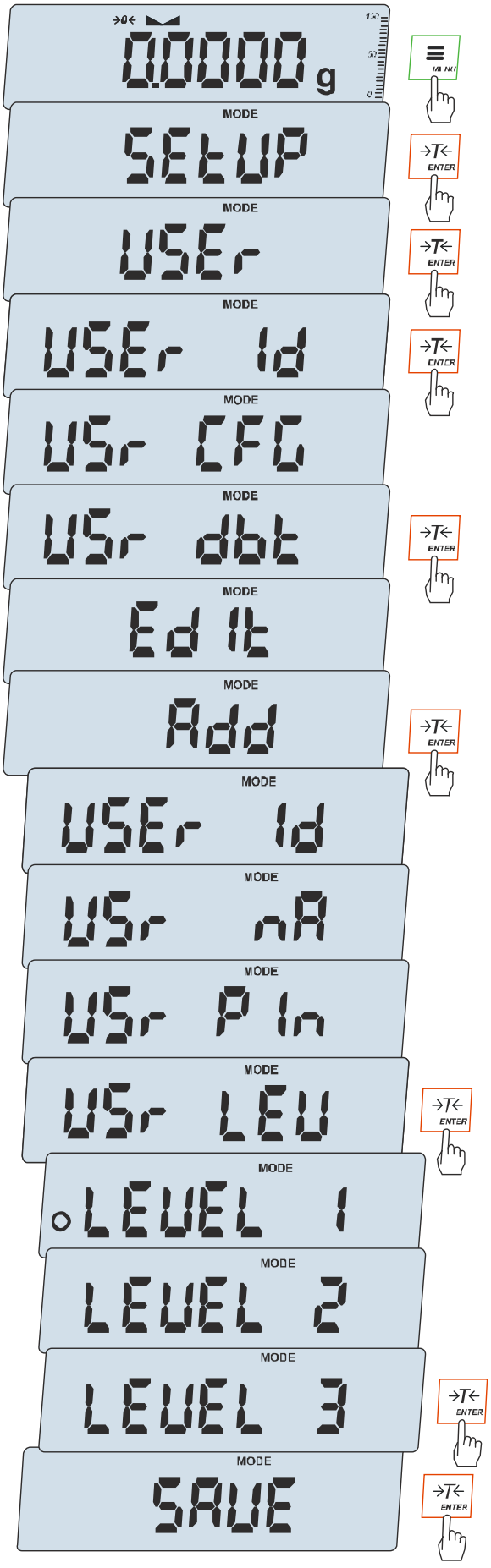


The scale has a User database that allows you to enter Users' identification data and determine the level of their authorization to interfere with the scale's settings.

Attention:
USEr function is fully active after adding at least one User with the highest level of authorization (*LEVEL 3*).
If no Users have been entered in the database, the use of the scale is not subject to any restrictions ***login is not required*** .

To log in, use *the SEtUP* and *USEr* or options **hold down the key longer** .

USEr function options :
- *USEr Id* – User's identification number,
- *USr CFG* – login mode:
  - *Std* – standard mode - each User ID can be selected (entered) and the lowest level of authorization is automatically assigned,
  - *LIMIt* – limited mode, only Users previously entered into the database can log in,
- *USr rSt* – this option allows the User to be automatically logged out if the scale is unused for a selected period of time,
- *USr dbt* – User database, allows you to add, edit or delete a User,
- *out* – exit from logging in



User database (*USEr db* t)

The user database allows you to save identification data and authorization levels, and also allows you to add, edit or delete Users.

To access the database, use *the SEtUP, USEr and USr dbt options* .

After selecting *Add* or *Edit,* the User can enter the User ID (max 8 characters), name (max 12 characters), PIN code (max 8 characters) and User authorization level (*USr LEV*). Finally, to save the User in the database, select *SAVE* .

User rights:

1 - overview of 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,
- change of scale settings and Users of *the SEtUP option*

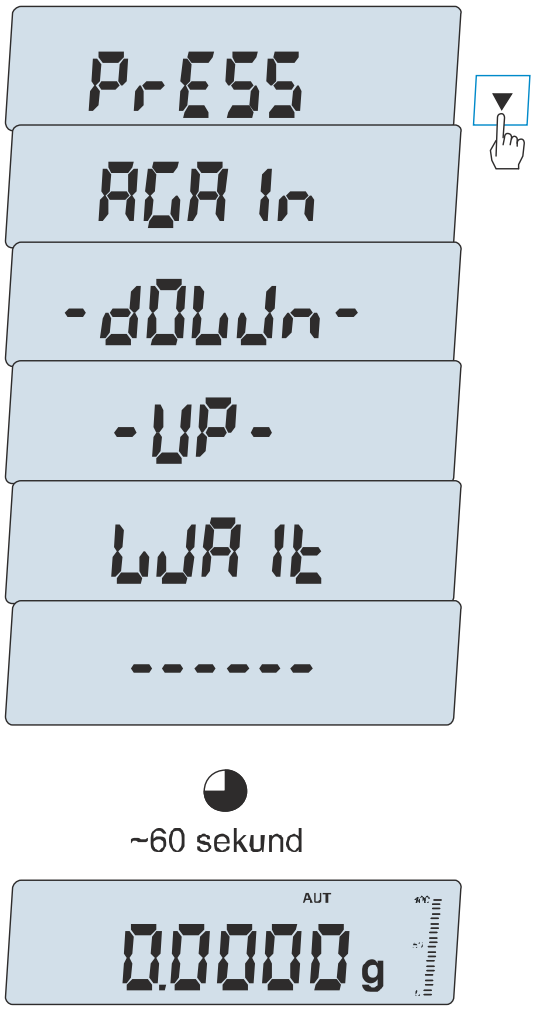
16.2 Calibration of the scale with internal mass standard

The scale is equipped with an internal calibration system whose task is to ensure the required accuracy of measurements performed on the scale.
Internal calibration consists in automatic application of an internal mass standard by the scale mechanism and correction of its accuracy in the scale program. The correction is necessary due to the different values of acceleration due to gravity in the place where the scale was manufactured and where it is used, as well as due to changes in the level of the scale, changes in temperature, etc.
Approximately 1 hour after turning on the scale, internal calibration starts automatically in the following situations:

- after pressing a key ▼ (twice),
- at specified time intervals (for verified scales - 2 hours),
- when temperature changes (for verified scales - by more than 1 ˚C).

In verified scales, the time interval is 2 hours and the temperature change is 1 ˚C. In non-verified scales, these values can be changed as calibration options.
Approximately 1 hour after turning on the scale, the scale signals the need to perform internal calibration by flashing the *HOLD icon* on the display.

HOLD symbol appears, follow the steps below:



Empty the weighing pan.

Press the key ▼ twice (pressing the key twice is to avoid accidental activation of the calibration procedure).
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 scale to be blocked.
Do not perform any operations on the scale until the calibration process is completed. Any shocks and vibrations of the scale 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 scales, you can press the *CLR key* and wait until the mechanism is set to the home position.

Internal calibration options:

Internal calibration takes place automatically for 1 hour after each time the scale is turned on. Then calibration must be performed manually. This is reminded by the *HOLD icon* that appears after the set operating time and each time the ambient temperature changes by more than the set value.

To perform internal calibration, empty the pan and press the key twice ▼ (pressing the *CLR key* interrupts calibration).

Use *the MENU key* to call up the function menu and select the *CALIb function by pressing the ENTER* key when it is displayed.

The following options will appear:

- *CAL on* – calibration with an external mass standard
- *CAL StP* – calibration with full external load. with confirmation of placing the weight standard,
- *CAL Prn* – calibration report
- *CAL tM* – setting the time interval (1h – 6h)
- *CAL °C* – setting the temperature difference (1 °C - 4 °C)
- *out* – output without internal calibration

Press the *ENTER key* while *CAL tM* is displayed . The internal calibration intervals will be displayed sequentially.

Select the desired value by pressing the *ENTER key.*

Similarly, select *CAL °C* by pressing the key *ENTER* and selecting the temperature difference value.

To exit, select *out* .

Calibration report printout form *(CAL Prn option)* **:**

```
--------- CALIBRATION REPORT ----------

APN220  MAX=220g  e=0.001g  d=0.0001g
S/N     :    1234
PROD.DATE: 2024-05-10
FIRM.VER.: ASL_01

FACTORY EXT.LOAD :   200.000  g
FACTORY INT.LOAD :   196.131  g
CALIBRATION NO.  :       1
CALIBRATION DATE : 2024-01-22
CALIBRATION TEMP1:   30.346 'C
CURRENT EXT.LOAD :   200.000  g
CURRENT INT.LOAD :   196.131  g
WEIGHT DIFFERENCE:    0.00  g
```

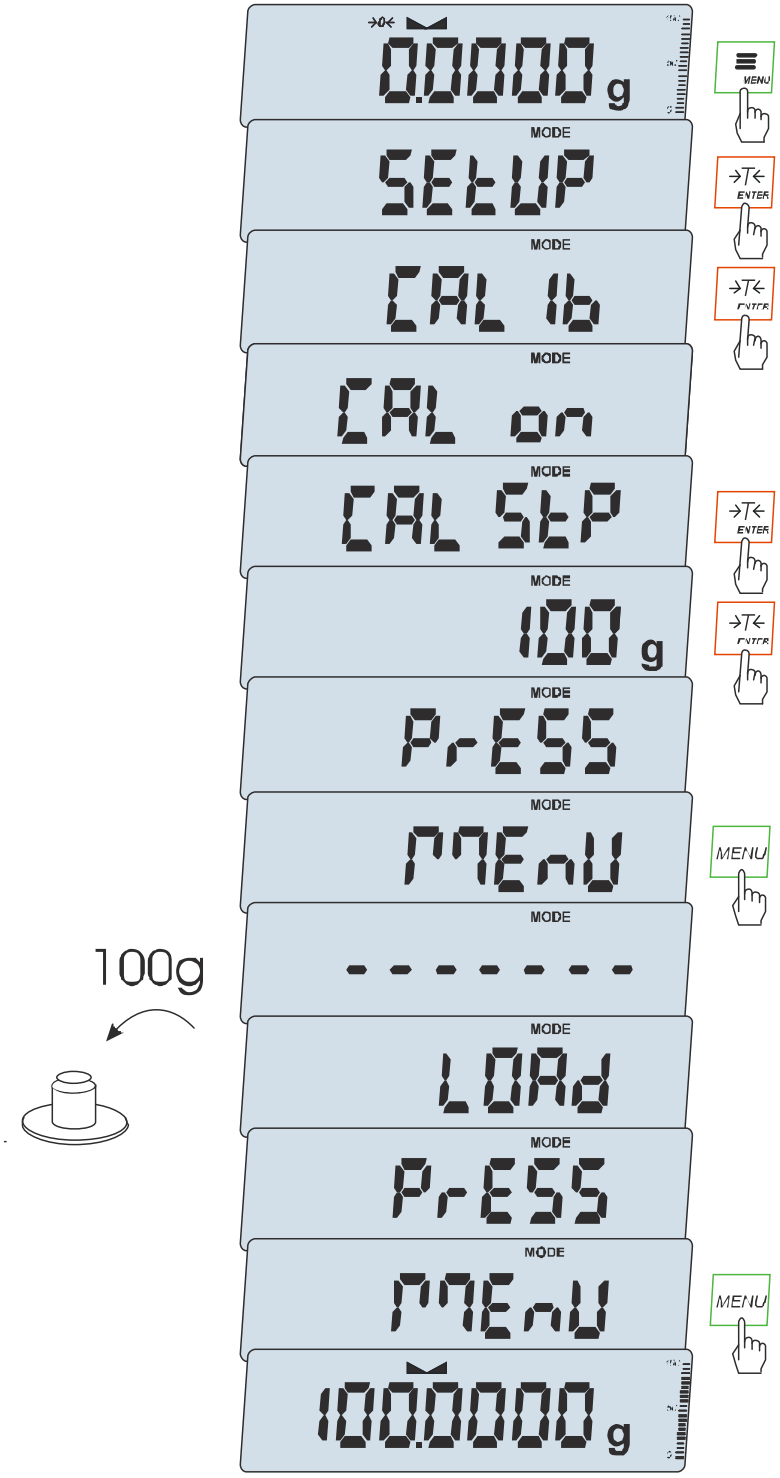
16.3 Calibration with an external mass (CALIb)

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

Calibration of a verified scale 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 scales intended for verification, calibration requires changing the position of the adjustment switch located under the security mark (sticker) of the Office of Measures. Access to the switch is only possible after removing the sticker. Calibration of the scale therefore 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 scale is used.
Before calibrating a verified scale, use a thin screwdriver to turn the adjustment switch to the *ON position* (signaled on the scale's display by the message *Pr ON*).
After completing the calibration process described on the next page, the scale will display the *Pr ON message* . Using a thin screwdriver, turn the adjustment switch to the *OFF position* . The scale will switch to weight display.

Sequence of steps when calibrating with an external mass standard:

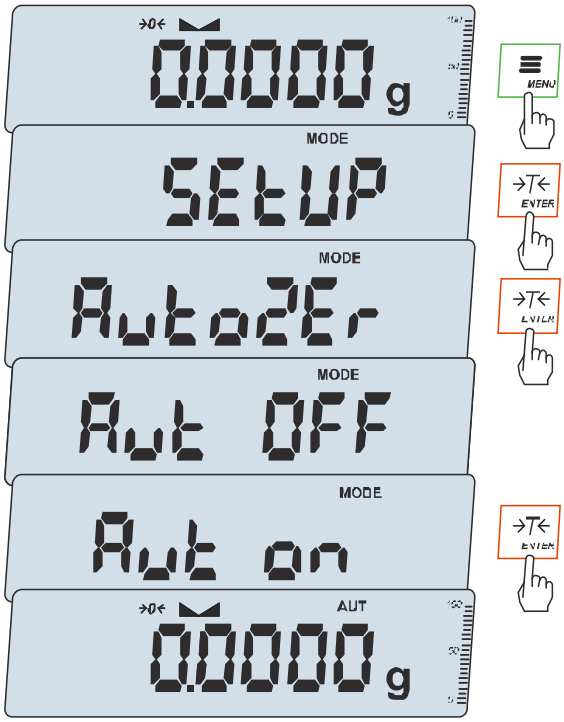


Press the *MENU key.*

Press ENTER *while* CALIb is *displayed* .
The following options will be displayed:
- *CAL on* – calibration with full load (with the standard from the technical data table),
- *CAL StP* – full load calibration with confirmation of the application of a standard mass,
- *CAL Prn* – calibration report,
- *CAL tM* – setting the time interval for internal calibration,
- *CAL ℃* – setting the temperature difference for internal calibration,
out – exit without calibration.
Press the *ENTER key* when *CAL StP is displayed* (calibration in two steps confirmed by pressing the *MENU key*).
Press the *ENTER key* when displaying the mass of the standard that will be used for calibration or use the *othEr option* and enter the appropriate value (keys *navigation and ENTER*).
Press the *MENU key* and wait for the weight zero to be saved, signaled by "- - - - - - "
LOAd appears, apply the weight standard. Press the *MENU key* (*the CAL on option* does not require pressing the *MENU key*).
Wait until the calibration is completed and the weight is displayed **.**

Note: Using the CAL on option instead of CAL StP frees you from pressing the MENU key twice.

16.4 Automatic maintenance of zero scale indications (AUtotAr)



Enabling this option automatically maintains zero scale readings when the pan is not loaded.

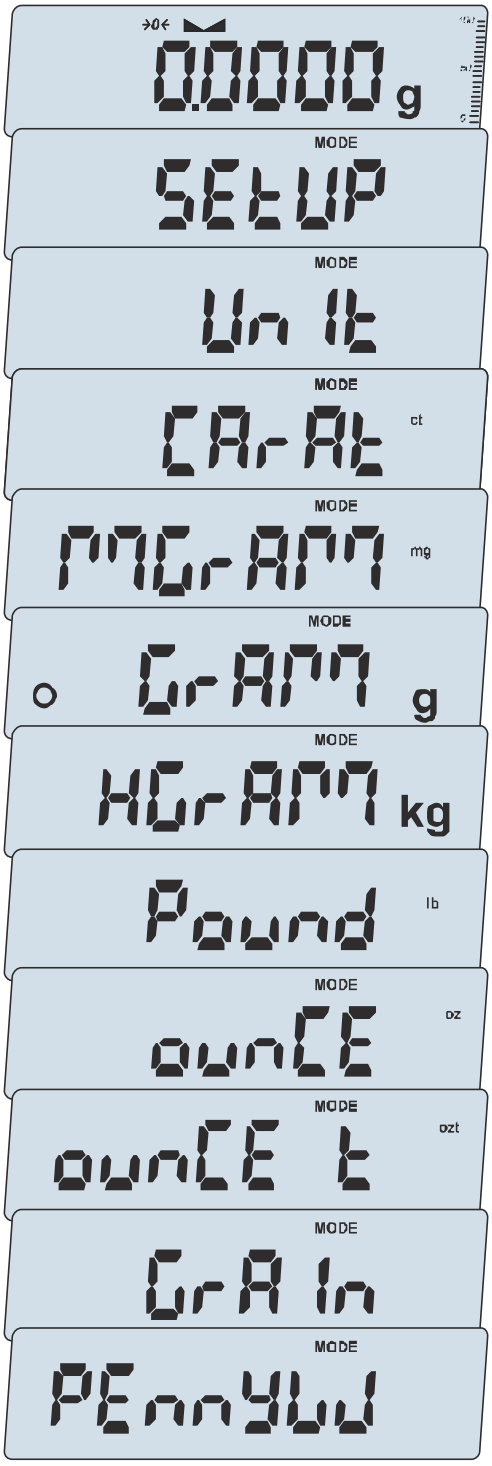
To enable the function, use the *MENU key* and use *the ENTER key* to select *AutoZEr* and then *Aut on* .

To finish working with the function, press the *MENU key* , then use *the ENTER key* to select *AutoZEr* and *AUt OFF* .

Comments :

1. *The AUT* sign appears only on scales with an LCD display.
2. On scales with an active *→0 key←* the function changes its name to *AutoZE* (auto taring) and also works when the zero indication is obtained by pressing the *→T key ←*.

16.5 Selecting the weight unit (UnIt)



UnIt option (in *SEtUP*) allows you to select the indicated weight measurement unit as the default one:

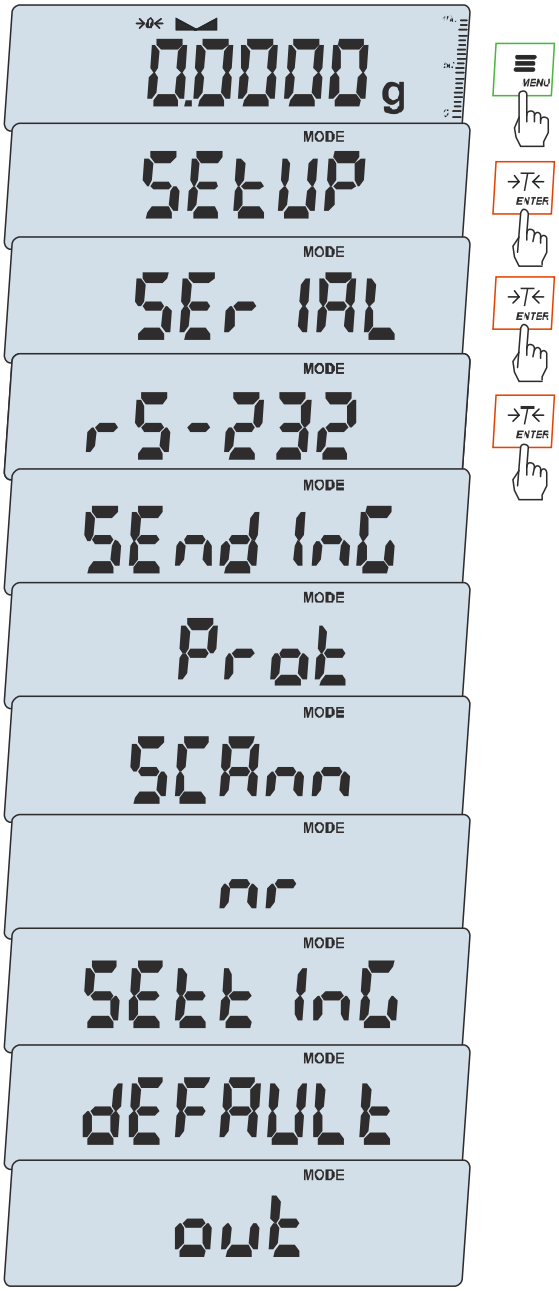
- *MgrAM* (1mg=0.001g – milligram),
- *GraAM* (1g) – I play,
- *kGrAM* (1kg = 1000g – kilogram),
- *CarAt* (1 ct= 0.2 g) – carat,
- *Pound* (1 lb = 453.592374g) – English pound,
- *OunCE* (1oz= 28.349523g) – ounce,
- *OunCEt* (1ozt= 31.1034763g) – pharmacy ounce,
- *GrAIn* (1gr= 0.06479891g) – gran
- *PennYW* (1dwt = 1.55517384g) – jewelry unit of mass.

Reading accuracy for individual units:

Unit	Reading plot
g	0.0001 g
kg	1000 g
mg	0.1 mg
ct	0.001 ct
lb	(0,)000 0005 lb
oz	0.000 005 oz
ozt	0.000 005 oz
gr	0.002 gr
dwt	0.0001 dwt

The selection is made by pressing the *ENTER key* while the unit is displayed.

16.6 Setting serial port parameters (SErIAL)



The option allows you to set the transmission parameters independently for each port:

RS-232C, USB-Device, USB-Host or LAN (optional)

- Transmission (*SEndInG*):
  StAb – transmission after pressing the key and stabilizing the display,
  Auto – transmission after putting on and taking off the goods without using a key ,
  Cont. - approx. 10 results per second.
  Remove – transmission after removing the goods without use
  key,
  SCAnn – cooperation with a scanner,

- Transmission protocol *(Prot)* :
  LonG – cooperation with a computer or printer ,
  EPL – cooperation with the labeling machine 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 the PEN-01 adapter,

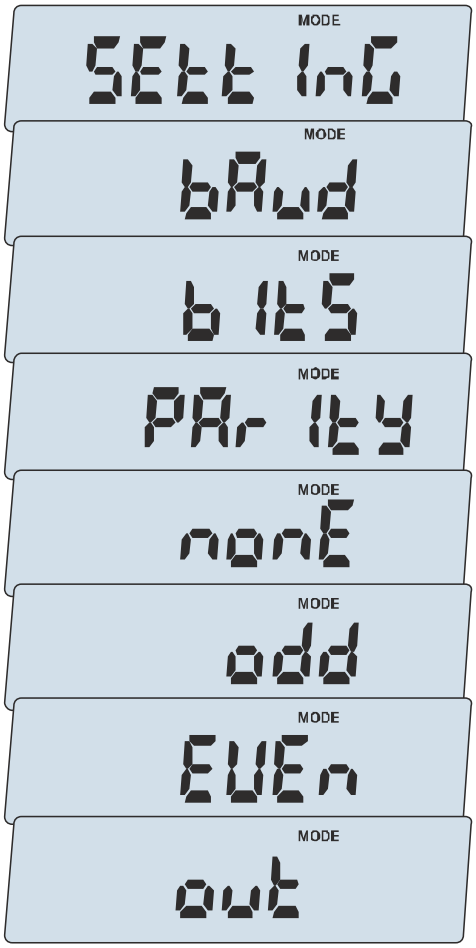
- Scanner *(SCAnn)* – cooperation with a dedicated barcode reader, waiting for the CR LF suffix and blocking transmission from the scale to the scanner,

- Scale number in the network (*no*): *if the scale does not work in a multi-station network, 0 should be entered,*

- Settings (*SEttinG*) – RS-232C: transmission speed, parity check, USB Host: file name on the pendrive, LAN: network parameters,

Detailed transmission options (*SendInG*):

StAb – transmission after pressing the key and stabilizing the display,
Auto – transmission after putting on and taking off the goods without using a key ,
Cont. - approx. 10 results per second.
Remove – transmission after removing the goods without use
key,
SCAnn – cooperation with a scanner,



Detailed settings (*SettInG*) for RS-232C:

bAud - transmission speed : *4800, 9600, 19200, ... 115,200, 230,400 bps* ,
bitS - number of bits in a byte: *7, 8* ,
ParItY - parity check:
none – no control,
Odd -odd ,
Even - parity,

Factory-set parameters: *StAb, Long, 9600 bps, 8 bits, nonE* .

Detailed settings (*SettInG*) for LAN:

dHCP – dynamic address assignment,

IP – network address of the scale,

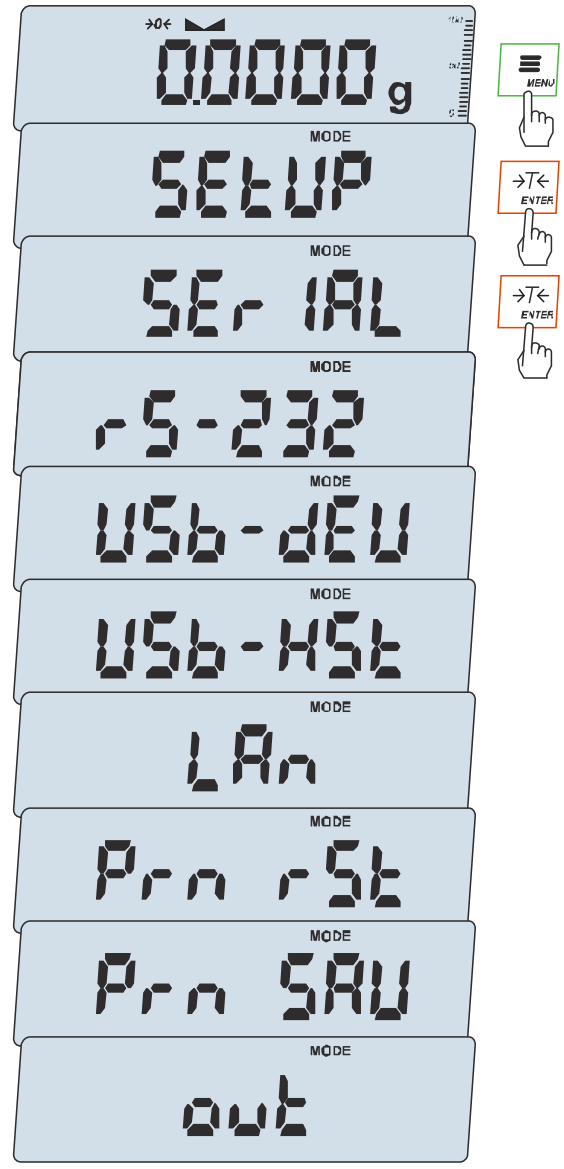
GAtEW – network gateway

MASK – subnet mask

MOdE – operating mode (client or server)

Port – protocol port number

1 6.7 Print configuration (Print)

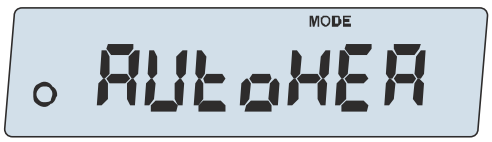


The option allows you to obtain extended printouts after pressing the key for a long time . The printouts additionally contain information identifying the weighed product and the scale user, previously saved in memory using the scale or scanner keys.

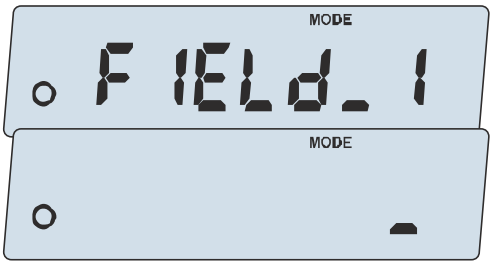
After selecting the *Print option* , the following options are available (note: the number of ports may vary depending on the scale's equipment):
- *Port 1* – port 1 print configuration (standard RS232C),
- *Port 2 (USB)* – print configuration for port 2,
- *USB hst* – print configuration for *USB hSt* (USB-A),
- *Prn rSt* – resetting the measurement number,
- *Prn SAV* – after the scale is turned off, the measurement number is saved in memory.

After selecting a port or USB host, options related to the location of information appear. The print page is divided into:
- *HEAdEr* – header,
- *VALUES* - content of the middle of the page,
- *FOOtEr* – footer.

Additionally, there are options:
- *AutoHEA* – automatic header printing only before measurement number 1,
- *FIELd_1* – print field no. 1 saved in the scale's memory (max. 20 characters),
- *FIELd_2* – print field no. 2 saved in the scale's memory (max. 20 characters),
- *FIELd_3* – print field no. 3 saved in the scale's memory (max. 20 characters),



Activation of the *AutoHEA option* is marked with a circle on the left.



Selecting *the FIELd _ …* option opens the process of filling ir the print field using the scale's navigation keys ←, ↑, ↓, →(only numbers here), through the active port of the computer
or scanner.

Selecting the header option (*HEAdEr,*) allows you to place the following data there:
- *bLn Lin – blank line,*
- *FIELd_1 – content of print field no. 1 from the scale's memory,*
- *FIELd_2 – content of print field no. 2 from the scale's memory,*
- *FIELd_3 – content of print field no. 3 from the scale's memory,*
- *ModE – printout of data of the active special function,*
- *dAt_tM – date and time,*
- *ModEL – scale type*
- *SEr no – serial number of the scale,*
- *USEr Id* – identification number of the scale User,
- *Prod Id* – product identification number ,
- *Prod bA* – product barcode (entered with a scanner),
- *SIGnAt* – place for signature.

Selecting the footer option (*FOOtEr*):
- *bLn Lin – blank line,*
- *FIELd_1 – content of print field no. 1 from the scale's memory,*
- *FIELd_2 – content of print field no. 2 from the scale's memory,*
- *FIELd_3 – content of print field no. 3 from the scale's memory,*
- *ModE – printout of data of the active special function,*
- *dAt_tM – date and time,*
- *ModEL – type of scales, i*
- *SEr no – serial number of the scale,*
- *USEr Id* – identification number of the scale User,
- *Prod Id* – product identification number ,
- *Prod bA* – product barcode (entered with a scanner),
- *SIGnAt* – place for signature,
- *dSh Lin* – a dash along the entire length of the line,
- *L3 trillion* – 3 blank lines.

Selecting the footer option (VALUES):
- *bLn Lin – blank line,*
- *FIELd_1 – content of print field no. 1 from the scale's memory,*
- *FIELd_2 – content of print field no. 2 from the scale's memory,*
- *FIELd_3 – content of print field no. 3 from the scale's memory,*
- *ModE – printout of data of the active special function,*
- *dAt_tM – date and time,*
- *ModEL – type of scales, i*
- *SEr no – serial number of the scale,*
- *USEr Id* – identification number of the scale User,
- *dAtE – date,*
- *tImE – time,*
- *Prn no* - printout (measurement) number,
- *ALIbI* – measurement ID number in Alibi memory,
- *Prod Id* – product identification number ,
- *Prod bA* – product barcode (entered with a scanner),
- *Count* – number of pieces (applies to the *PCS function*),
- *APW* – unit weight of the detail (applies to the *PCS* function),
- *nEt* – net mass,
- *tArE* – tare ,
- *GroSS* – gross weight,
- *totAL* – total mass (applies to the *totAL function*),
- *In L no* – measurement number in one line with the measurement result,

- *rESuLt* – current scale indication,
- *In L dt* – date in one line with the measurement result,

Attention:

If *Prod Id* or *USEr Id has been selected* , it is possible to quickly enter their new values (bypassing the main menu). To do this, hold down the *MENU key for a longer time (approx. 3 seconds) and release it when Id Prod Id* or *USEr Id* is displayed . Then enter the new value using the navigation keys and *ENTER* .

When entering *the Prod Id,* you can use a scanner connected to the RS232C input.

If the scale is equipped with two serial connectors, after selecting the *Print function,* the user can choose independent print configurations for *Port-1* and *Port-2* .

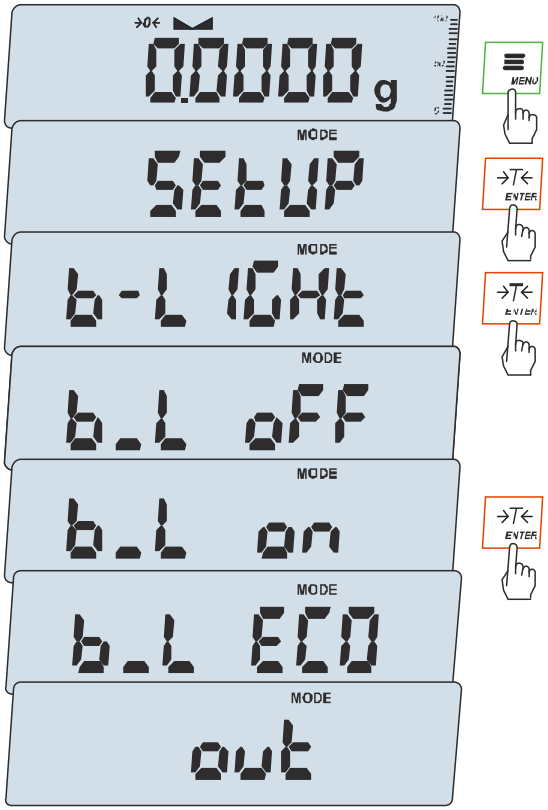
An example of what the printout will look like during normal weighing (short press of the key  , scale with watch, extended printout options inactive):

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

An example of the header and value printout during normal weighing with the clock option (long press of the key , extended print options active):

```
AXIS Sp. z oo.
80-125 Gdansk,
ul.Kartuska 375B
ACN220
S/N  :  100

User ID          : 000001
Date             :  2012-11-08
Time             :  12:26
Prn no           :   3
Product ID       :  000001
Count            :  0 PCS
APW              :  0.0000 g
Net              :  11.8000 g
Tare             :  0.0100 kg
Gross            :  11.8100 g
Total            :  33.0100 g
Signature        _________________
```

1 6.8 Scale display backlight (b_LIGHT)



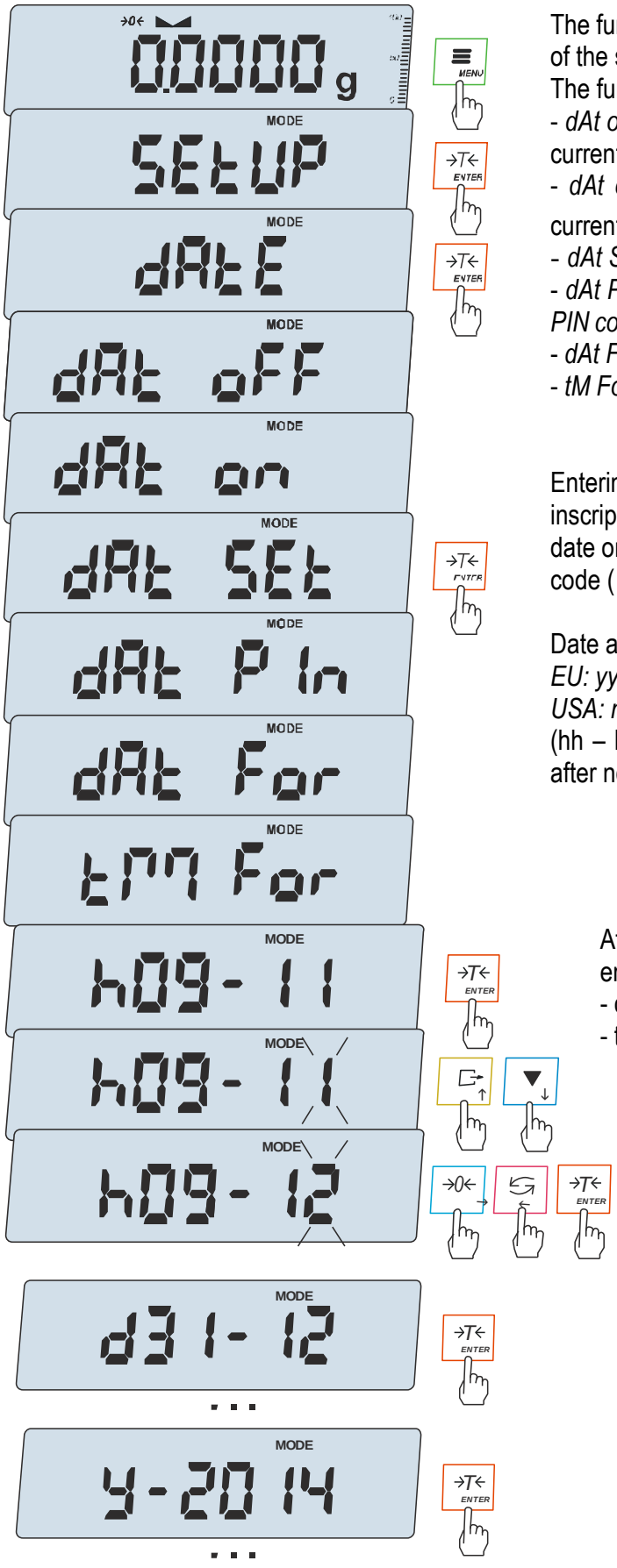
The function is used to turn the display backlight on or off.
The function has the following options:
- *b_Lt oFF* – backlight off,
- *b_L on* – backlight on,
- *B_L ECO* – the backlight turns off after approximately 1 minute of inactivity.

16.9 Selecting the menu language (LANG)

The option allows you to select the language for printed reports and messages.

The following languages are available:
- En – English
- PL – Polish
-dE- German
- ES – Spanish
- Fr – French
- It – Italian
- CZ – Czech
- ru – Russian
- UA - Ukrainian

1 6.10 Setting the current date and time (dAtE)



The function allows you to set the current date and time of the scale's internal clock and their display format.
The function has the following options:
- *dAt oFF* – deactivation of date and time when printing current scale readings,
- *dAt on* – activation of date and time when printing current readings (key),
- *dAt SEt* - change the current date and time.
- *dAt Pin* - securing access to changing the date with *a PIN code* (after entering the code, save or remember it).
- *dAt For* - date printout in *US* or *EU format* ,
- *tM For* - time printout in *24h* or *12h format.*

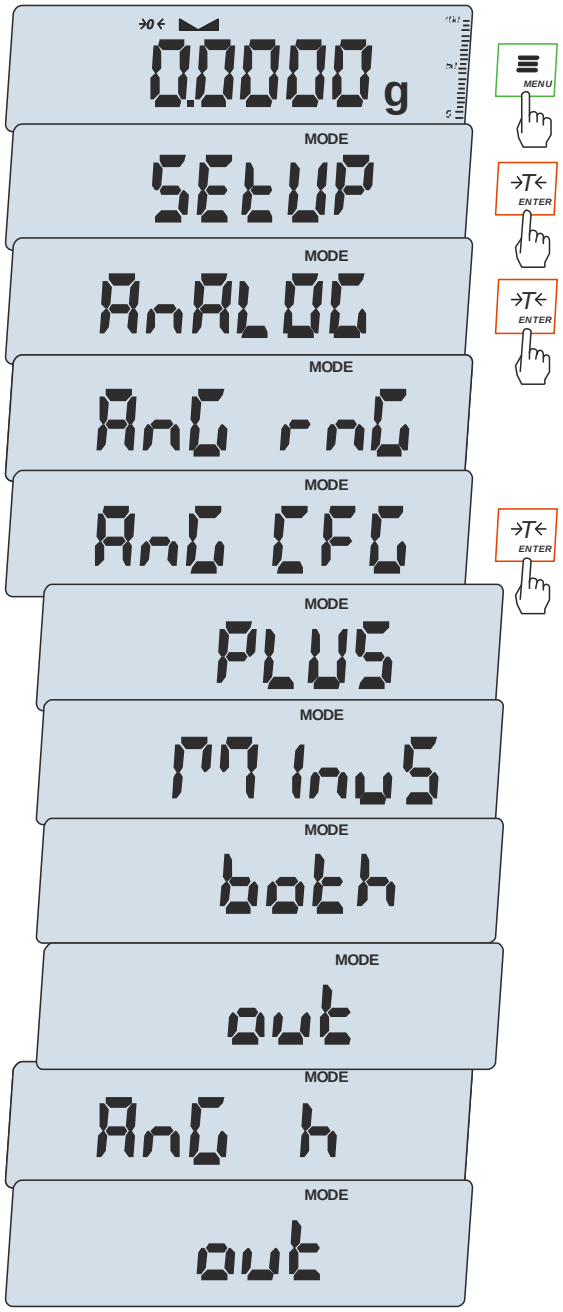
Entering a non-zero *PIN value* causes the *PIN* inscription to appear the next time you try to set the date or time and you are required to enter the 4-digit code (using the navigation keys and *ENTER).*

Date and time format:
EU: yyyy-mm-dd hh:mm
USA: mm-dd-yyyy hh:mm AM/PM
(hh – hours, mm – minutes, AM – before noon, PM – after noon, mm – month, dd – day, yyyy – year).

After selecting the dAt SEt option, the following is entered in accordance with the selected format:
- current hour and minute
- the last two digits of the year, month and day

While entering, appropriate suggestions appear: Y – year, E (rotated M) – month, d -day.

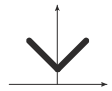
1 6.11 Analog output (AnALOG)



This option allows you to set the operating mode of the analog output (4-20mA or 0-10V) used, for example, in PLC controllers:

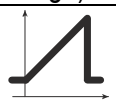
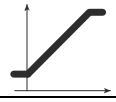
- *AnG rnG* – entering the Max mass value
- *AnG CFG* – output configuration (*PLUS* – work only for positive scale indications, *MinuS* – only for negative scale indications, *both* – for positive and negative):

Current output status table for *AnG CFG option* :

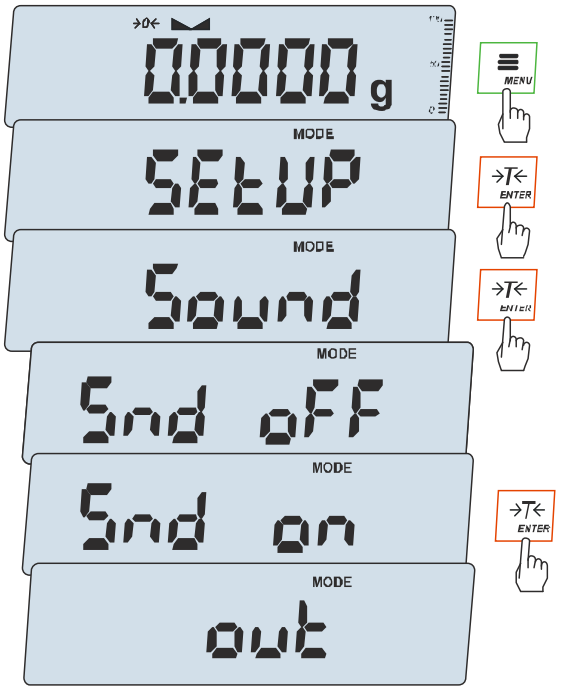
AnG CFG	Indication	Current (voltage)	
PLUS	0	4mA (0V)	
	Max	20mA (10V)	
Minus	0	4mA (0V)	
	-Max	20mA (10V)	
Both	- ½ Max	12mA (5V)	
	0	4mA (0V)	
	½ Max	12mA (5V)	

- *AnG h* – setting the reaction to exceeding depending on the *AnG CFG option* (*h zero* – 0mA after exceeding, *h Max* – Max current after exceeding)

Analog output overflow table. for the *AnG h option* :

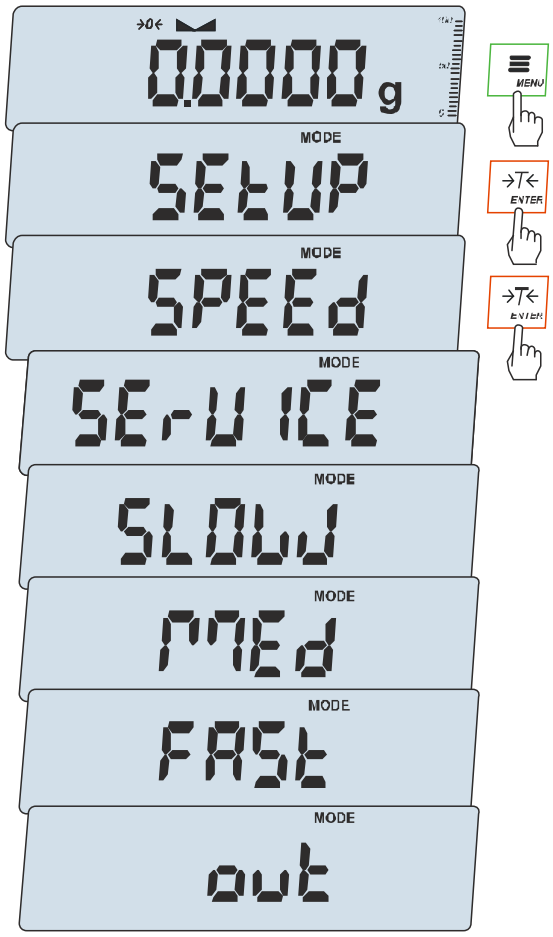
AnG h	*Ang CFG*	Indication	Current (voltage)	
h zero	-	< 0	4mA (0V)	
		> Max	4mA (0V)	
h Max	-	< 0	4mA (0V)	
		>Max	20mA (10V)	

1 6.12 Sound when pressing a key (Sound)



The option allows you to turn on a sound signal every time you press a key, making it easier to operate the keys. The sound can be turned off if it is not needed or disturbs other people in the room.

16.13 Selection of weighing speed (SPEEd)



The option allows you to change the weighing speed, which allows you to better use the scale's capabilities and adapt it to the measurement conditions.

To enable the function, use the *MENU key* and use *the ENTER key* to select *SPEEd* and then one of the options:

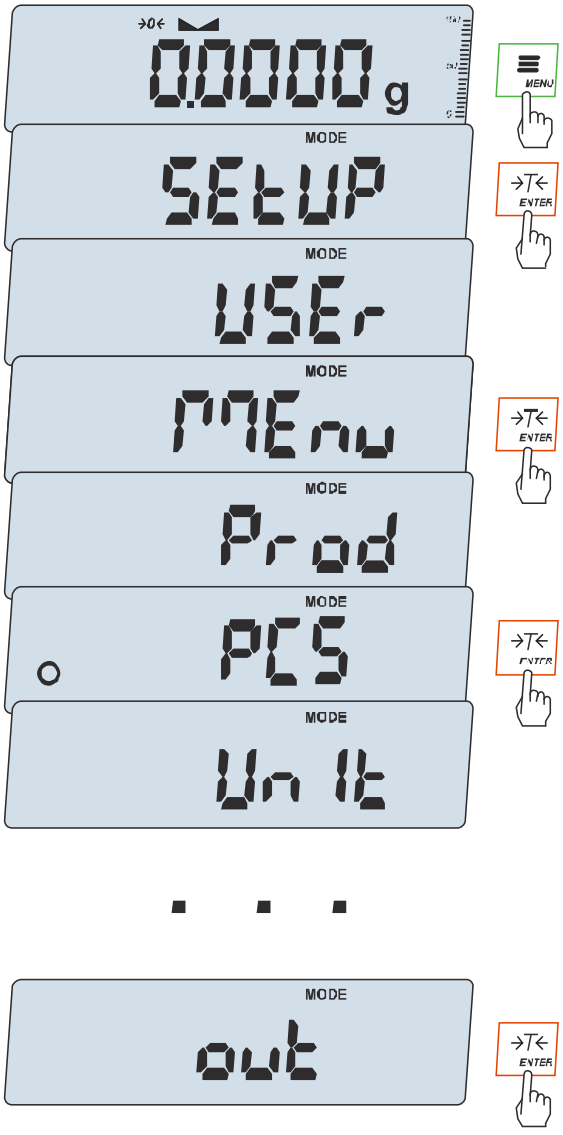
- *SErVICE* – direct measurement (service option)
- *SLOW* – slow measurement,
- *MEd* – medium,
- *FASt* – accelerated,

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

17. Scale utility functions menu

All scales, apart from the basic metrological functions: weighing and taring, have a number of utility and configuration functions collected in the scale menu.

In order to facilitate the use of the function, the User can create his own menu, available by using the *MENU key* . Thanks to this, there will be no functions that you do not use on a daily basis.



How to create your own menu:
When you turn on the scale for the first time, after pressing the *MENU key, only the SEtuP* option appears , which contains all the configuration options.

One of the configuration options is the *MEnu option* , used to create your own menu of utility functions.

Including a utility function in your own menu is done by pressing the *ENTER key* when the symbol of a given function is displayed.

Selecting a function for your own menu is indicated by the " o " symbol added to the left of the shortcut. After selecting all the necessary functions, use the *out option* to return to weighing. Now, after pressing the *MENU key, the user has access to the previously selected functions and the SEtuP* option .

dEFAULt option is used to restore the factory settings of the menu.

18. Functions of the scale

Before using the function, the User should create his own menu where he can place the function he is interested in (described in the previous chapter). Then the selected function will appear after pressing the *MENU key* .

List of utility functions:

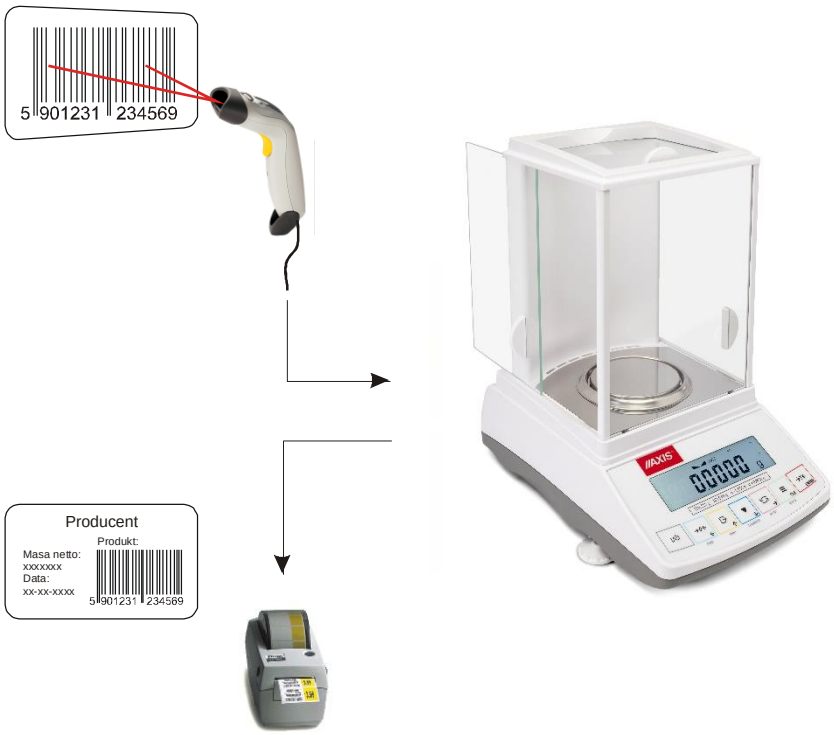
- product identification (*Prod)*
- piece counting (*PCS*)
- selection of current mass unit (*Unit*)
- percentage conversion (*PErC*)
- selecting the label number (*LAbEL)*
- animal weighing (*LOC*)
- remembering the entered tare value (*PtArE*)
- maximum value indication (*UP*)
- force measurement *(nEWton)*
- summing a series of weighings (*totAL*)
- comparison with set threshold values *(thr)*
- statistical calculations *(StAt)*
- determining paper weight *(PAPEr)*
- density measurement *(DEnSItY)*
- recipe preparation *(rECIPE)*

LabEL function is available only in scales with the *EPL or EPL-A* data transmission protocol (see *SetuP / SErIAL option*).

18.1 Product identification (Prod)

In order to facilitate work with many products, the scale has a product database that allows you to enter their basic identification data: ID, barcode, packaging tare, Min and Max weight, associated scale function, e.g. counting pieces when this product is counted.

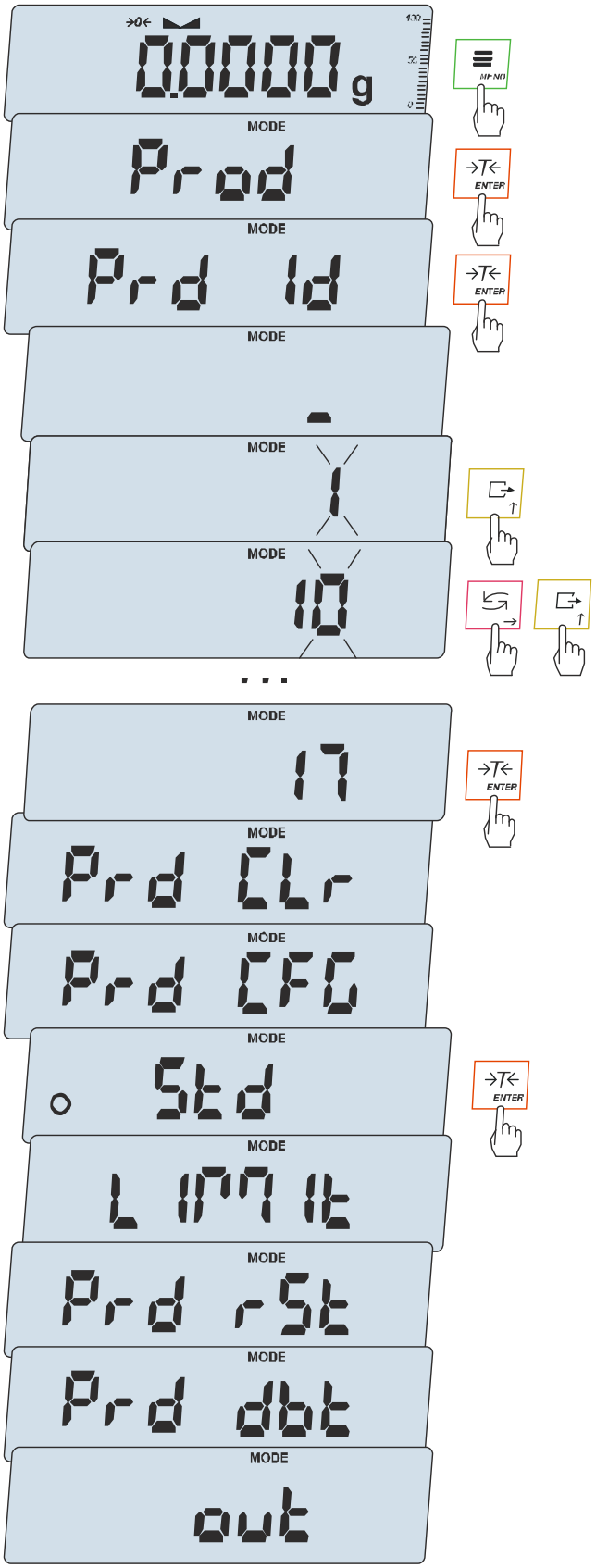
Product identification is especially necessary when the scale cooperates with external information devices such as a scanner, printer, labeling machine or computer. It is then possible to build the simplest systems for identifying products and archiving weighing results.
The use of barcodes and a scanner is particularly beneficial here, because entering multi-digit data using navigation keys is inconvenient (the scale does not have digital keys).



After selecting the product and User, it is possible to send (to a computer or printer) the current weight indication along with additional data, selected using the *PrInt* (*SEtuP*) option:

- *HEAdEr* – header (scale type, Max, d, e, serial number),
- *USEr Id* – identification number of the scale User,
- *USEr nA* – scale User name (*option unavailable*),
- *Prn no* - printout (measurement) number,
- *Prod Id* – product identification number ,
- *Prod bA* – product barcode (entered with a scanner),
- *Prod nA* – product name (*option unavailable*),
- *Count* – number of pieces (applies to the *PCS function*),
- *APW* – unit weight of the detail (applies to the *PCS* function),
- *nEt* – net mass,
- *PtArE* – product tare (packaging weight),
- *GroSS* – gross mass,
- *totAL* – total mass (applies to the *totAL function*),
- *no. - LCD* – printout of the Prn no number and scale indications in one line.

In scales with an installed clock, the current date and time are also available.



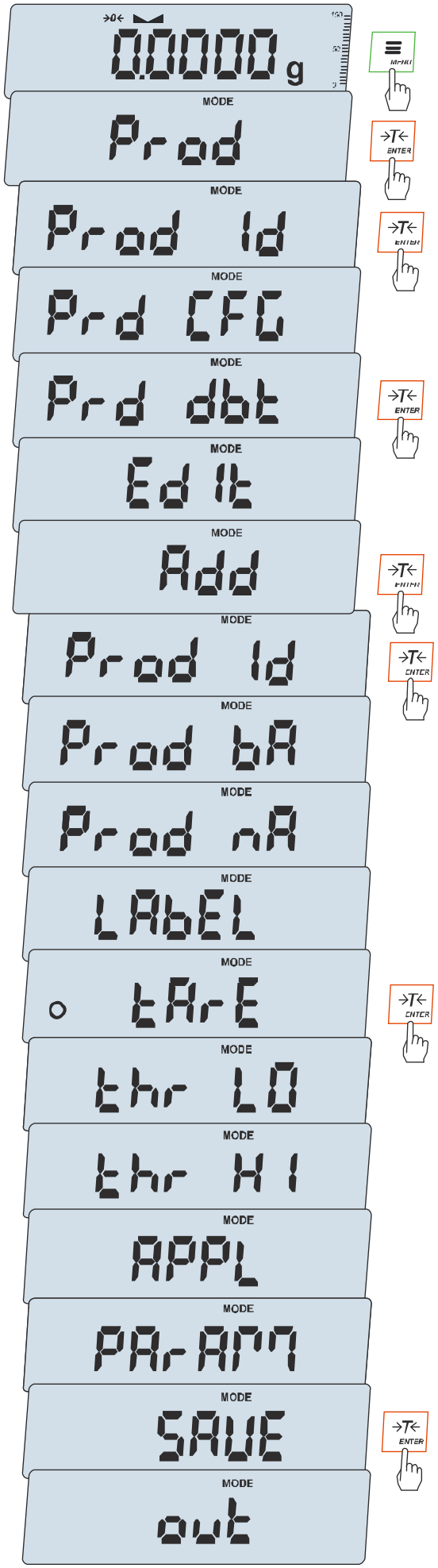
Product recall

To recall the product (login), use *the Prod* or function **hold down the key longer≡** .

Prod function options :
- *Prod Id* – User's identification number,
- *Prd CLr* – product deletion,
- *Prd CFG* – logging mode:
  - *Std* – standard mode - any product ID can be entered,
  - *LIMIt* – limited mode, only products previously entered into the database can be entered,
- *Prd rSt* – this option enables automatic logging out of the product if the scale is unused for a selected period of time,
- *Prd dbt* – product database, allows you to add, edit or delete a product,
- *out* – exit from product login

Attention:
Access to the product database requires logging in by a User with appropriate authorizations. Otherwise, the message *AccES dEnIEd appears* .
Found message means that the product with the given ID has been found in the database, *Not Found* - there is no product in the database.

You can also use a scanner connected to the RS232C or USB Host input of the scale to enter the product ID, which significantly speeds up work and helps avoid errors.



Product database (*Prod dbt*)

The product database allows you to save identification data and add, edit or delete products.

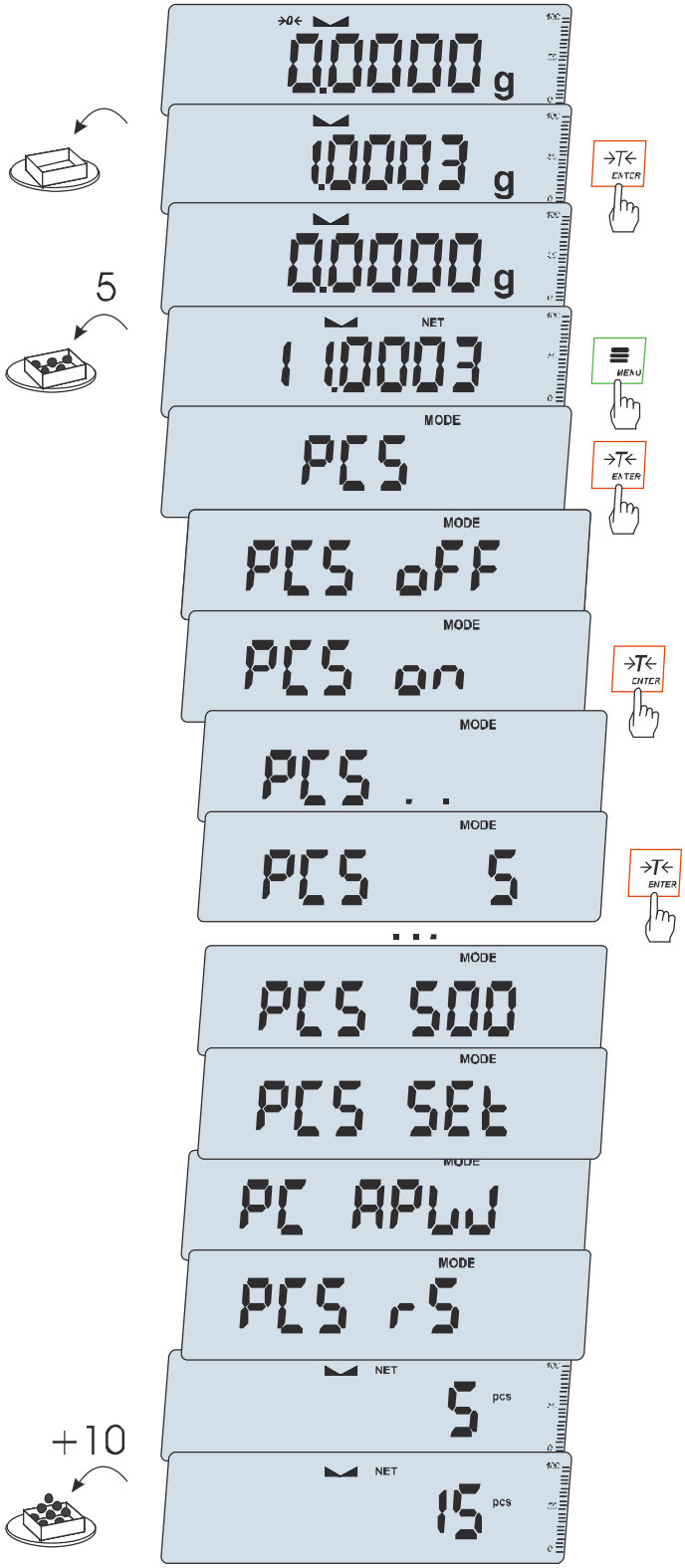
To access the product database, use the *Prod function* .

Attention:
Access to the product database requires logging in by a User with appropriate authorizations. Otherwise, the message *AccES dEnIEd appears* .

After selecting *Edit* or *Add,* the User can enter:
- Product ID (max 8 characters),
- barcode (max 16 characters),
- name (max 12 characters),
- label number (max 4 characters),
- product packaging tare,
- Min weight of the product,
- Max product weight,
- assigned special function,
- special function parameters.

Finally, to save the product in the database, select *SAVE* .

18.2 Piece counting function (PCS)



This function allows you to count identical details, e.g. screws or nails contained in the weighed portion.

The measurement takes place in two phases:
- phase one - calculation of the weight of a single detail based on a sample of a specified number of pieces: *5, 10, 20, 50, 100, 200* or *500* pieces,
- phase two - counting the details in the weighed portion.

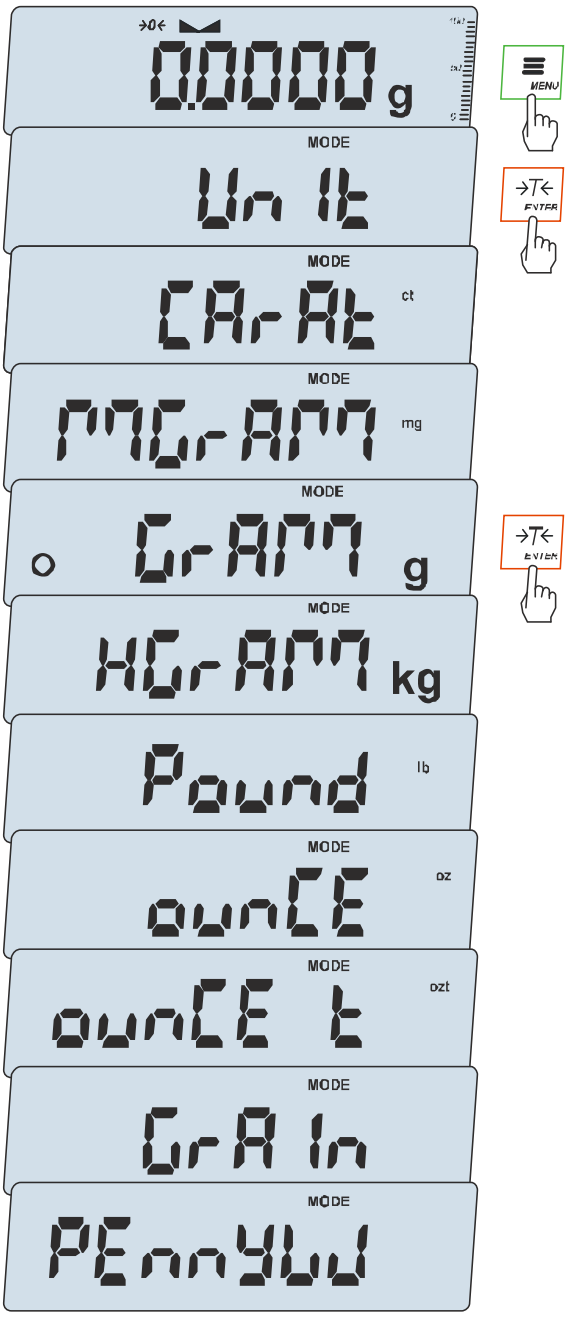
Options for the first phase:
- *PCS . .* - recalling the previously entered value (this value must be entered earlier),
- *PC SEt* - entering any quantity,
- *PC APW* - direct entry of the mass of a single detail (navigation keys *and ENTER*) ,
- *PCS rS* – entering the number of details in the sample and taking their weight from another scale connected via RS-232C.

It is recommended that the mass of one detail be greater than the scale's reading unit and the mass of the sample used in the first phase be greater than 100 reading units.
To end the function, press the *MENU key* and then, using the *ENTER key* , select *PCS* and *PCS oFF* .

Comments:
1. The *APW too LOW message* means that no sample was placed on the pan or the mass of a single detail is less than one tenth of the reading unit (counting is not possible).

2. The *APW LOW message* means that the mass of a single detail is greater than one tenth of a division, but less than one reading division (you can start counting pieces, but errors increase, the counting result blinks).

18.3 Selecting the current weight unit (UnIt)



UnIt option (in the Menu) allows you to select the current measurement unit of the scale (until the power is turned off):

- *GraAM* (1g) – I play,
- *kGrAM* (1kg = 1000g – kilogram),
- *MgrAM* (1mg=0.001g – milligram),
- *CarAt* (1 ct= 0.2 g) – carat,
- *Pound* (1 lb = 453.592374g) – English pound,
- *OunCE* (1oz= 28.349523g) – ounce,
- *OunCEt* (1ozt= 31.1034763g) – pharmacy ounce,
- *GrAIn* (1gr= 0.06479891g) – gran
- *PennYW* (1dwt = 1.55517384g) – jewelry unit of mass.

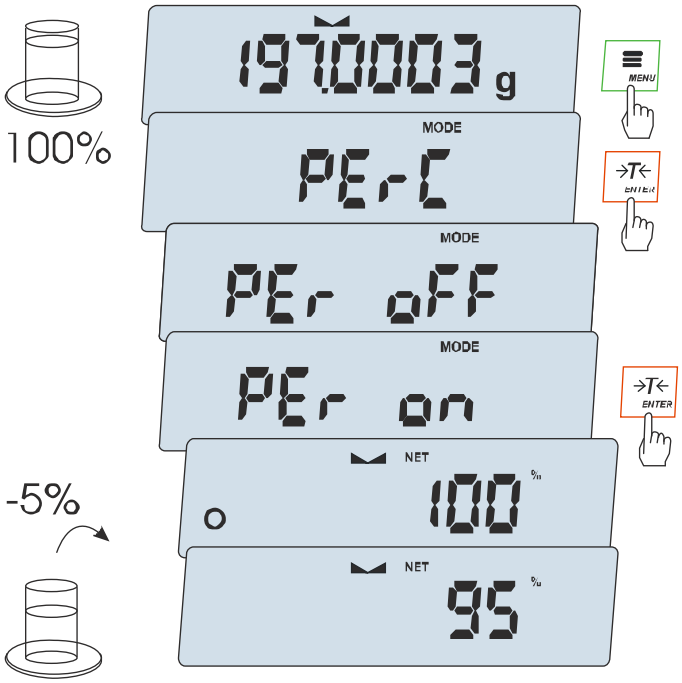
- *UnI oFF* – return to the default unit (set in *SEtuP*).

Reading accuracy for individual units:

Unit	Reading plot
g	0.0001 g
kg	1000 g
mg	0.1 mg
ct	0.001 ct
lb	(0,)000 0005 lb
oz	0.000 005 oz
ozt	0.000 005 oz
gr	0.002 gr
dwt	0.0001 dwt

The selection is made by pressing the *ENTER key* while the unit is displayed.

18.4 Percentage conversion function (PErC)



This function allows you to obtain weight indications in percent.

The measurement takes place in two phases:
- phase one - measurement of the mass constituting 100%
- second phase - measurement of any mass as a percentage of the mass measured in the first phase.

Depending on the mass used as a standard, the percentage comparison result will be displayed in various formats, actively using the scale's resolution in the entire measurement range.
The function has the following options:
- *PEr oFF* – turning off the function,
- *PEr on* – entering the current scale indication as 100%, moving to indications in %.
- *out* – exit without changing the setting.

Attention:
PER Err message informs that the mass entered as 100% is less than 0.5*Min entered.

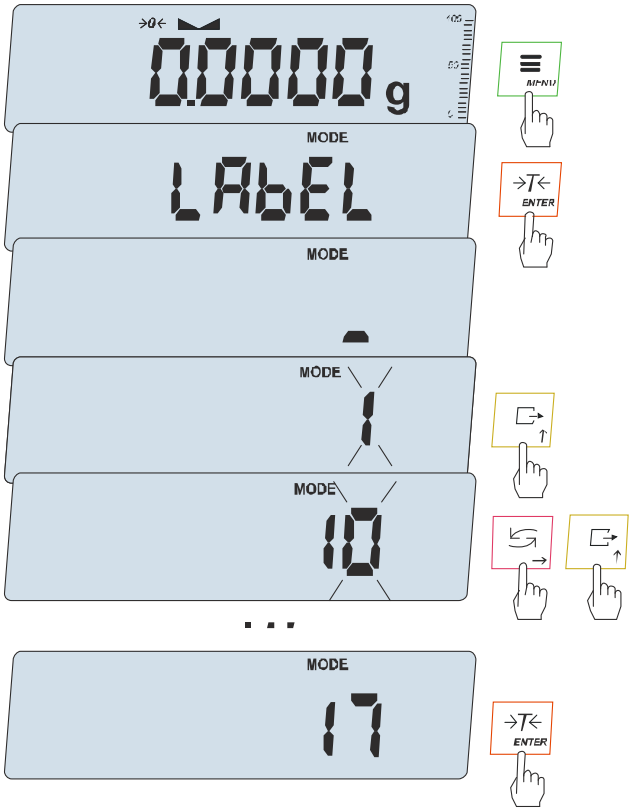
18.5 Label number selection function (LAbEL)

This function allows you to select a label template. Appears in scales where the data transmission protocol for the labeling machine was previously selected, marked as: *EPL (see SErIAL* option). Label templates used by the user, provided with a number (maximum 4 digits), should be previously saved in the printer's memory using the *Designer design program* . The label template is selected by calling the *LAbEL function* and entering the label template number.

The scale allows you to print a label with the current weight indication and other data selected using *the PrInt* (*SEtuP*) option:

- *HEAdEr* – header (scale type, Max, d, e, serial number),
- *USEr Id* – identification number of the scale User,
- *USEr nA* – scale User name (*option unavailable*),
- *Prn no* - printout (measurement) number,
- *Prod Id* – product identification number ,
- *Prod bA* – product barcode (entered with a scanner),
- *Prod nA* – product name (*option unavailable*),
- *Count* – number of pieces (applies to the *PCS function*),
- *APW* – unit weight of the detail (applies to the *PCS* function),
- *nEt* – net mass,
- *PtArE* – product tare (packaging weight),
- *GroSS* – gross mass,
- *totAL* – total mass (applies to the *totAL function*),

In scales with an installed clock, the current date and time are also available.
Other data, e.g. company address, product composition, etc. may appear on the label as permanent texts.



Press the *MENU key* .
When *LAbEL is displayed,* press the *ENTER key* .
The current label number will appear on the display.
To enter a new label number, press *ENTER* and enter the label number.

Use the navigation and *ENTER keys to enter the label number* :

After entering the label number, applying a load and pressing a key sends data to the label printer.

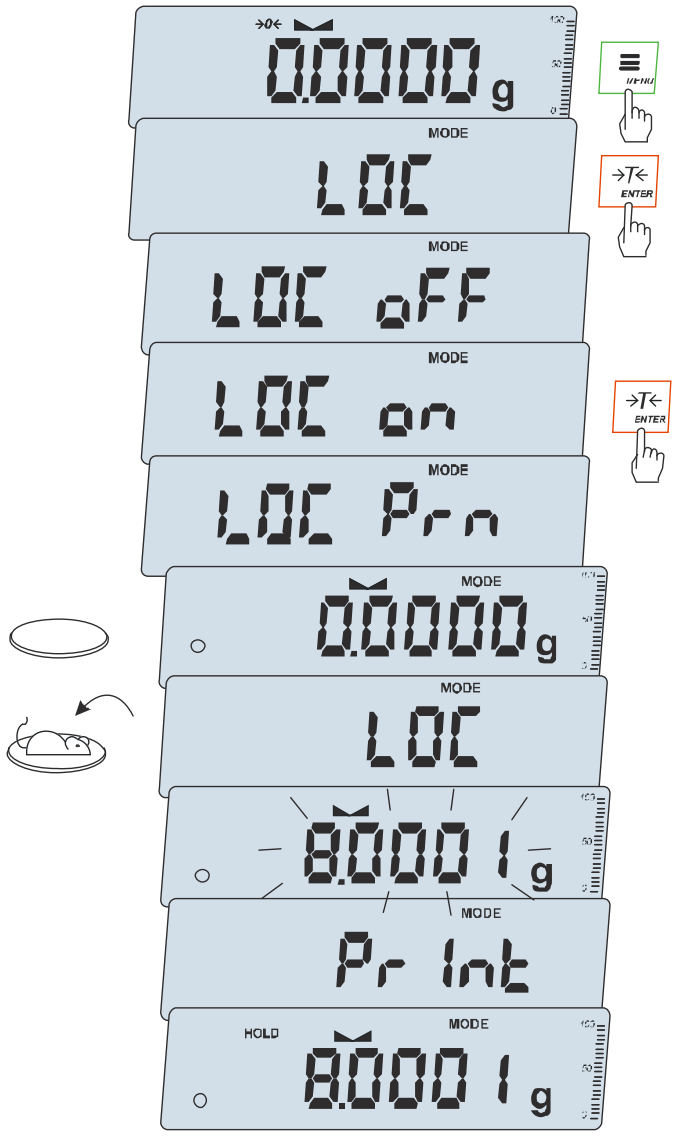
To exit the function without changing the number, use the key *CLR.*

Format of data sent to the label printer (label no. 35, EPL-2 language):

US	(55 53 0D 0A)
FR"0035"	(46 52 22 30 30 30 33 25 0D 0A)
?	(3F 0D 0A)
00:00	(30 30 3A 30 30 0D 0A)
2000.00.00	(32 30 30 30 2E 30 30 2E 30 30 0D 0A)
10 g	(20 20 20 20 20 31 30 20 20 67 0D 0A)
P1	(50 31 0D 0A)

18.6 Animal weighing function (LOC)

This function allows you to weigh an animal moving on the scale.



When the pan is empty and the scale display is zero, press the *MENU key* .

When *LOC appears,* press the *ENTER key* .

The display will show the following:

- *LOC oFF* - exit from the function,
- *LOC on* - automatic measurement after loading the scale,
- *LOC Prn* - measurement initiated manually by pressing the key .

When *LOC on is displayed, press the ENTER* key .

If necessary, tare the scale using the *→T key* ←and then place the animal on the scale.

Wait until the result is averaged - the scale display will "blink". Then the scale will indicate a stable average result and send it via the serial port to a printer or computer.

The result remains on the display for approximately 30 seconds, after which the scale is ready for the next measurement.

After completing a series of measurements, turn off the function (LOC oFF) to restore normal operation of the scale.

Comments:

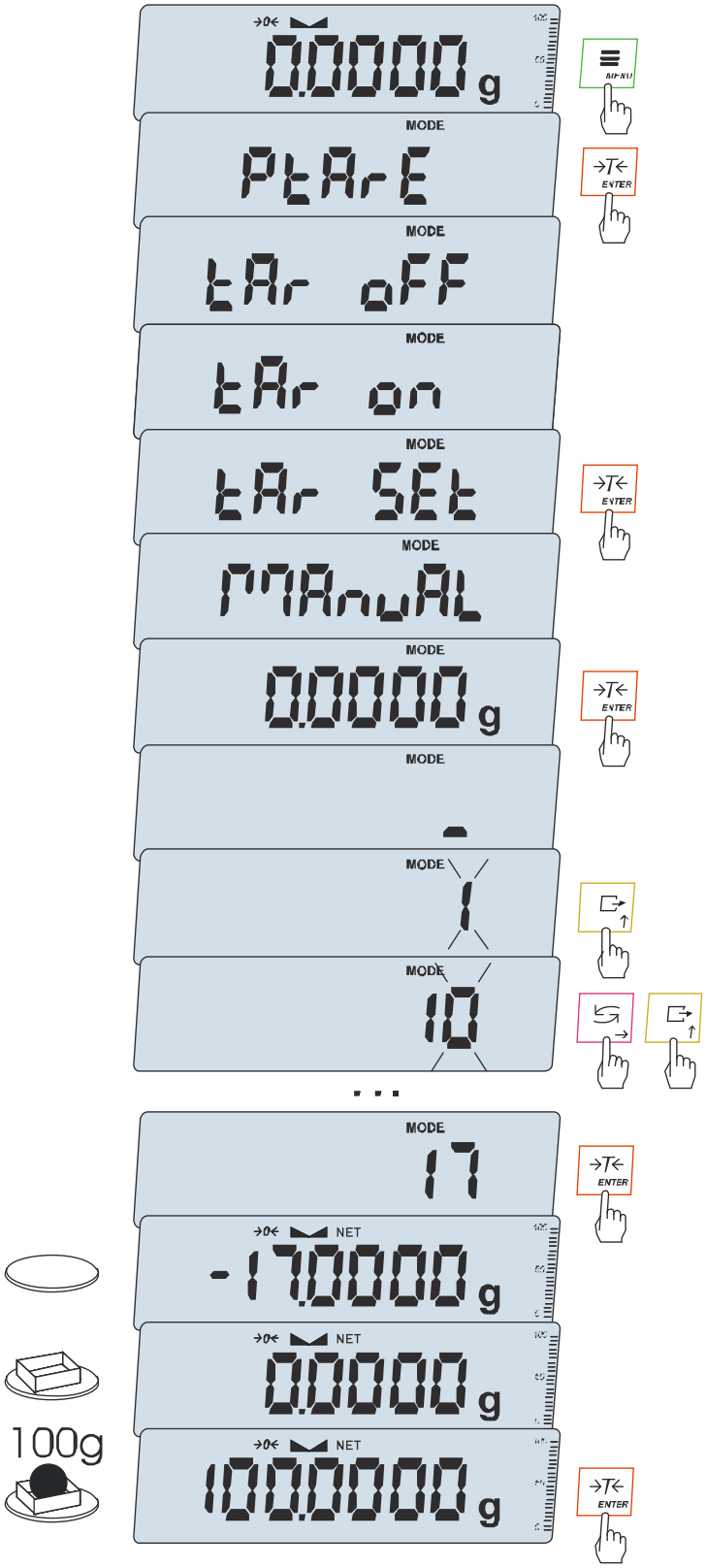
1. Load less than Min weight is not averaged.

2. When placing the animal on the scale takes longer than 5 seconds. it is recommended to select the *LOC Prn option* (manually initiated measurement), this will allow you to perform the measurement at a convenient time by pressing the key .

18.7 Tar memory function (PtArE)

This function allows you to measure the gross mass of goods in a container of known mass and then read the calculated net mass of the goods. To calculate the net weight, enter the tare value into the scale's memory. The entered tare value can be recalled by pressing the *→T key ←*(when the pan is loaded) or *→0 ←(* with unloaded pan). Entering the tare value can be done using the scale keys or "by nature", when it is possible to place an empty container on the pan.

Entering the tare value into memory:



After pressing the *MENU key* and selecting *the PtArE function* using the *ENTER key,* the following options are displayed:

- *tAr OFF* – turning off the function,
- *tAr on* – activation of the function with previously entered tare,
- *tAr SEt* – entering the tare value into memory,
- *out* – exit from the function.

To enter the tare value, press the *ENTER key* when *tAr is displayed SEt* .

Select an entry option:
- *MAnUAL* – entering using navigation keys and *ENTER* ,
- *Pan* – entering the value of the mass currently located on the scale pan.

After making an entry into the memory, the scale starts working with the entered tare value.

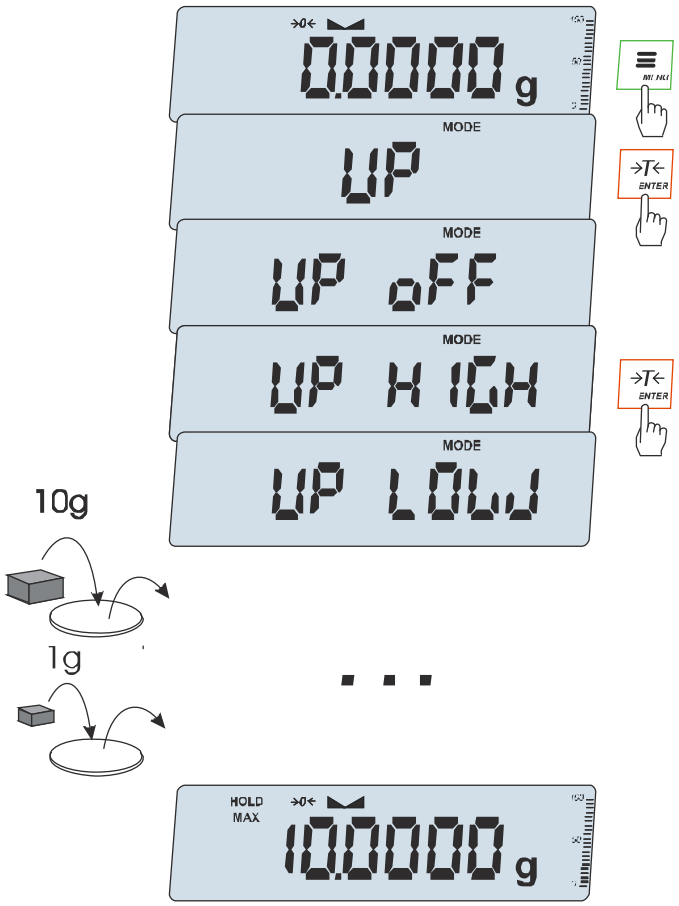
After loading the scale and pressing the *→T key←* the scale indicates the gross weight minus the previously entered tare, i.e. it indicates the net weight.

Comments:

Key Additionally, it allows you to switch between net weight (NET) and gross weight (B/G).
The tare value is also remembered after the power is turned off.

18.8 Maximum value indication function (UP)

The function allows you to keep the extreme value temporarily indicated by the scale on the display.



Before measurement, the scale must be tared.
The function has the following options:

- *UP oFF* – disables the function
- *HIGH* – holding the highest value
- *LOW* – hold the lowest value

Pressing the *→T key ←*does not reset the result.

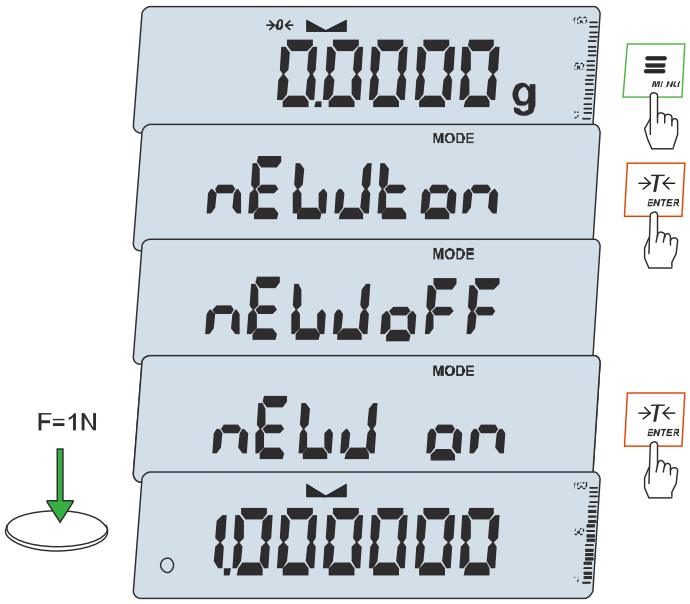
Attention:

While *the UP function is running* , the auto-zero function and the stabilization indicator are suspended.

Key *→0←* resets the scale to zero with the pan unloaded.

18 .9 Force measurement function (NEWton)

Enabling the function displays the scale's indications in force units (N).



Press the key *MENU. With* a using the *→T key←* select a function *nEWton.*

The function has the following options:

- *nEW oFF* – disables the function

- *nEW on* – measurement in Newtons

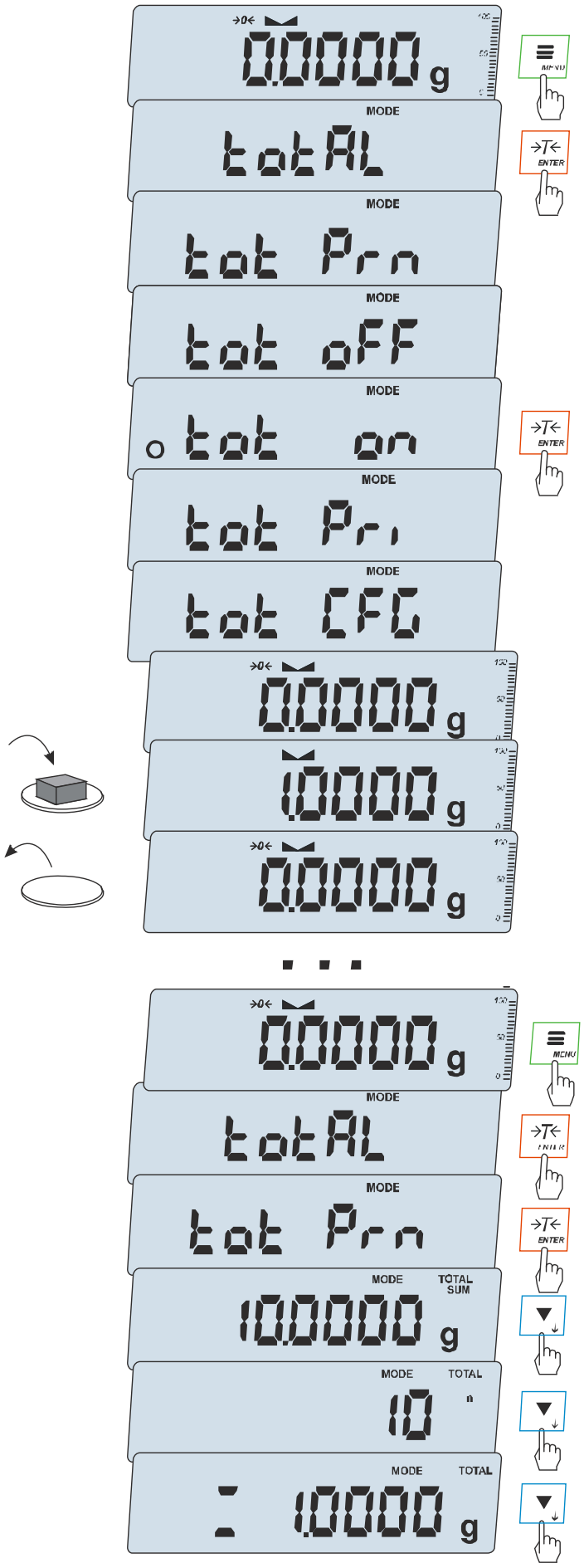
With a using the *→T key←* select *nEW on.* The scale displays in Newtons, and the activity of the function is indicated by the "o" sign on the left.

Attention:

The conversion of mass units (g) into force units (mN) is performed for the normal gravitational acceleration (g_a = 9.80665 m/s2):

1mN ≈0.101971g

18. 10 Weighing series summing function (totAL)



The function allows you to add subsequent measurement results to the summing register and then read the sum of masses, number of measurements and average value.

- *tot Prn* - print report without deleting the summing register,
- *tot oFF* - resetting the summing register, printing the report and exiting the function,
- *tot on* - work without printing receipts,
- *tot Pri* - work with printing receipts for each measurement,
- *tot CFG* – method of initiating measurement recording to the register (using the key ⮕: *ManuaL* , after removing and adding: *auto*),
- *tot tAr* – taring the scale after each entry to the register.

Press →*T*← when *tot on is displayed* .
Take a series of measurements by pressing the key⮕ after each measurement in order to enter the next result into the summing register.

In order to print and display the results, re-enter the function by selecting *totAL* and *tot P* rn from the menu

The following are displayed:
- sum of measurements performed (SUM)
- number of measurements entered into the register (n)
- average value of measurements (=)

and the display of subsequent values is achieved by pressing the key ▼.

To end work with the function and simultaneously reset the total register to zero, confirm the end of the measurement series by pressing the *ENTER key* and then selecting *YES* when *the totAL End message is displayed* . This will display the *Print message* and print a message about resetting the registers.

The form of the receipt printed after each measurement:

```
Date: ... Time ...
measurement no. mass
measurement no. mass
```

Report form:

```
Date: ... Time ...
TOTAL WEIGHT =
NUMBER OF WEIGHTS =
AVERAGE VALUE =
```

Attention:

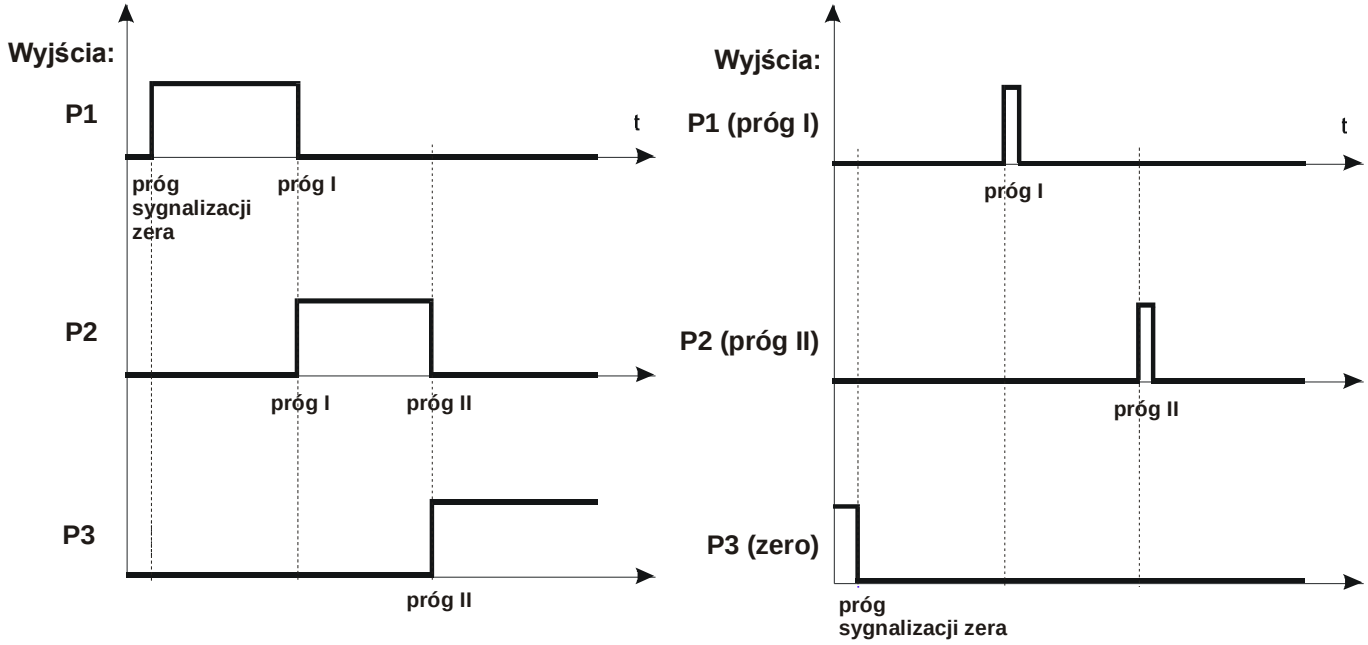
Maximum number of measurements: 99,999.
Maximum total value: 99,999,000d.
The value of the sum in the register (Total) is given on the display in the unit of measurement given on the keyboard or in a unit 1000 times larger, which is signaled by the "o" sign on the left side of the display.
If the register value does not fit, the letter "E" is displayed. If the number of measurements is too large and does not fit on the display, the message "Err 1" is displayed.

18. 11 Comparison function with set threshold values (thr)

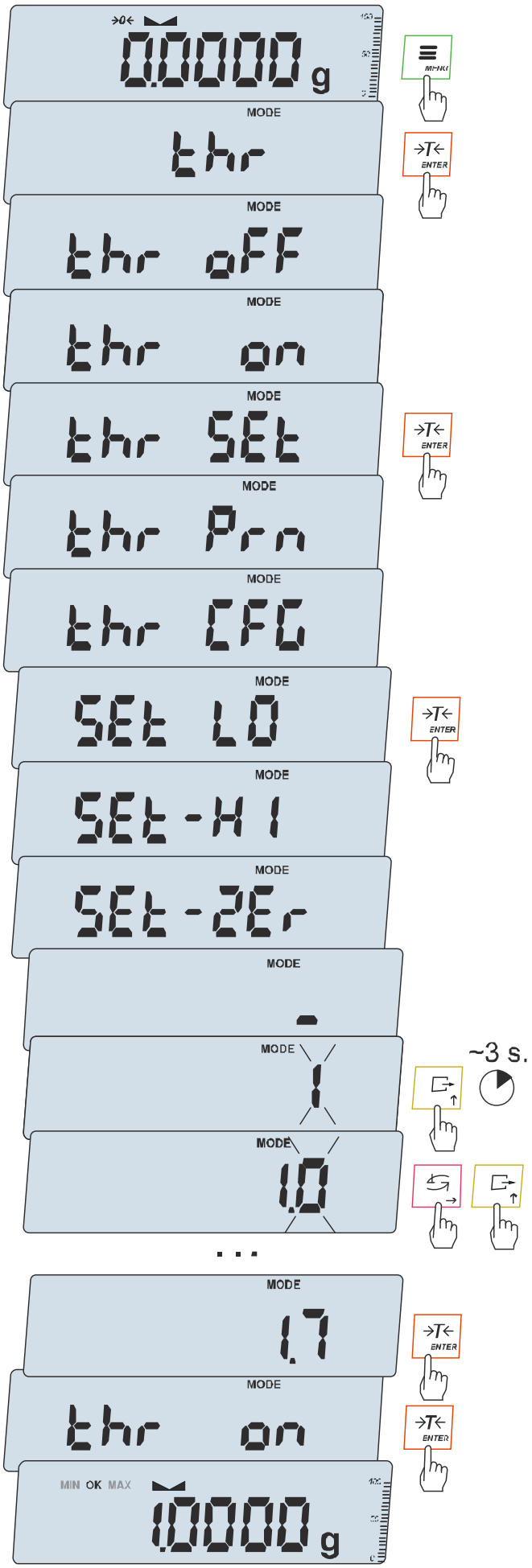
The function allows you to compare the weighing result with two previously programmed mass values: lower and upper threshold. The comparison result is signaled by the indicators lighting up *(MIN, OK, MAX)* and an acoustic signal generated when the thresholds are exceeded.
If the weighing result is:
- less than the zero signaling threshold - no signaling,
- smaller than threshold I - the scale signals too low a value (*MIN indicator*),
- between threshold I and II – the scale signals a good value (OK indicator and short sound signal),
- greater than threshold II - signals too high a value (*MAX indicator* and long acoustic signal).

In scales equipped with an optocoupler connector *Outputs* (designation: WY ⊓⊔) the comparison result can be used to control:
- optical indicator (*Signaler mode*),
- dosing devices (*IMPULSE mode*).

By default, the scale is set to work with an optical indicator.
Short-circuit states appear on the P1-P3 outputs of the *Output connector as results of comparing the scale indications with the threshold values.*
The chart below shows the states of the *Output connector* with increasing load on the scale for both operating modes **:**
Signaler Mode : *IMPULSE* Mode :



IMPULSE mode, short-circuit pulses with a duration of 0.5 s appear on the outputs P1 (threshold I) and P2 (threshold II). At the P3 output (zero), a short-circuit condition appears when the indication does not exceed the zero signaling threshold.



Sequence of actions:

Press the key *MENU* and select *thr by pressing the ENTER* key .
The display will show the following:
- *thr oFF* - turning off the function,
- *thr on* - enable the function,
- *thr SEt* - entering threshold values,
- *thr Prn* – checking the last entered threshold values (press repeatedly ⮆),
- *thr CFG* – mode selection for the *WY connector:*
IMPULSE – IMPULSE mode
SIGNAL. – Signaler mode
- *thr Stab* - result after stabilization,
- *thr rSt* - threshold reset after power off.

Use *ENTER to* select *thr SEt* .
Options for entering thresholds will appear:

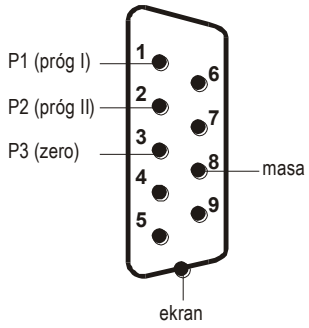
- *SEt-LO* - entering threshold I (lower),
- *SEt-HI* - entering threshold II (upper),
- *SEt- ZEr* - entering the zero signaling threshold.
- *out* - output for weighing with signaling of exceeded thresholds,

Use the *ENTER key to select the SEt-LO* option .
Set the value of the lower threshold using the navigation keys and ENTER.

Then select the *SEt-HI option* and enter the value of the upper threshold.
Selecting the *out option* will cause the scale to start working with simultaneous signaling of exceeded thresholds and zero.
The thr CFG option is used to change the operating mode of the *WY connector* . By default, the Alert mode is set .

To end the function, press the *MENU key* and then select *thr* and *thr oFF* .

Output Connector (designation: WY ⊓):



The connector is mounted in place of the RS232C or NC connector.

Output Connector is an open collector optocoupler output with a load capacity of 25mA / 24V.

It is recommended to use a ready-made MS 3K/P electronic board (3 relays - load capacity 3A/250V) or a complete ST 3K/P control box (power supply ~230V, 3 relays as above).

Comments:

1. After turning on the scale, both thresholds are set to maximum values.
2. When setting the upper threshold, make sure that its value is not lower than the lower threshold.
3. Setting the lower and upper threshold values is also possible by sending appropriate commands from the computer, which is described in the scale's user manual.

18.1 2 Statistics function (StAt)

The function calculates 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 scale 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.

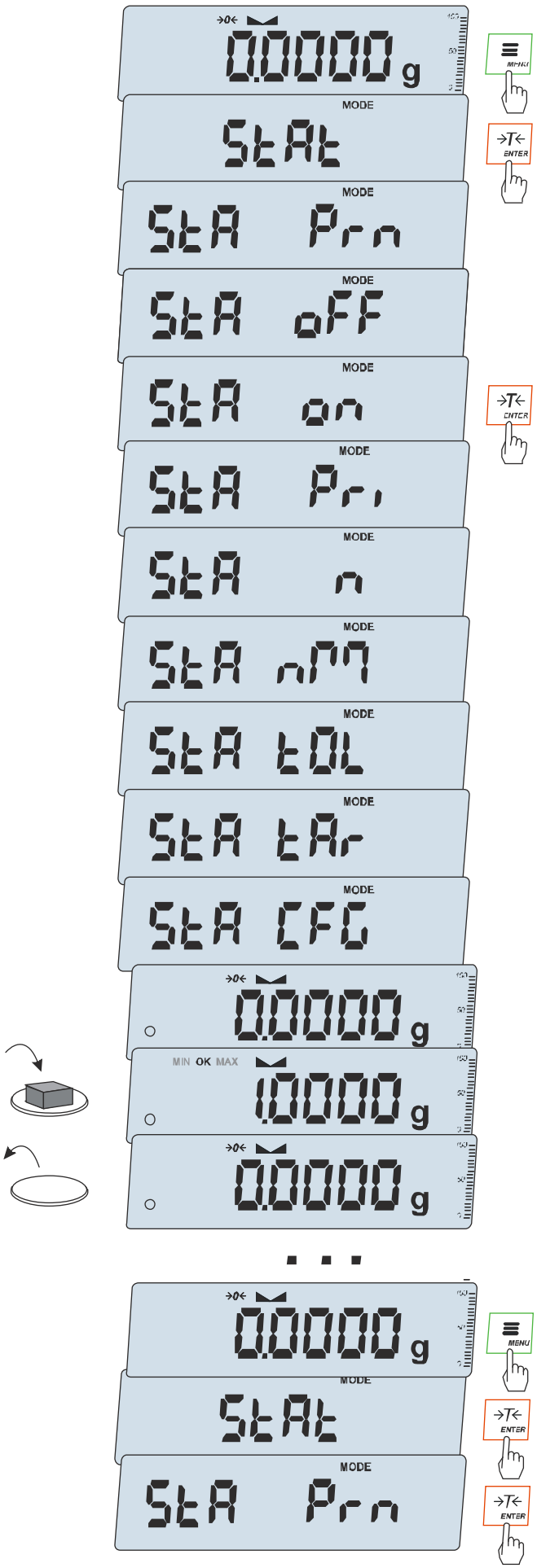
For the series of measurements obtained in this way, the scale calculates:

- 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 printer.

Sequence of actions:



Press the *MENU key* .
When *StAt is displayed,* press the *ENTER key* .
The display will show the following:
- *StA Prn* – preview and printout of statistical data,
- *StA oFF* – function deactivation,
- *StA on* – activation of the function, work with printing individual weighing results,
- *StA Pri* – activation of the function, operation without printing individual weighing results,
- *StA n* – maximum number of samples ,
- *Sta nM* – entering the nominal value for statistics,
- *Sta tOL* – entering tolerance in %,
- *Sta tAr* – automatic taring after each sample application,
- *StA CFG* – function configuration:
  -*Auto* – automatic operation (sample approved after being placed on the scale and stabilizing the reading),
  -*ManuAL* – manual operation (confirmation by pressing the key ⮕).
- *out* – exit from the function.

Please remember to enter the nominal value and tolerance before turning on the function. This will display the result rating: Min /OK/Max.
Place subsequent portions of the product on the pan (remove it after the scale readings stabilize) in order to enter them in the measurement register.
To obtain printed statistical results for a series of measurements, press the *MENU key* , press the *ENTER key* when the display shows *StAt* ., and then *StA Prn* . After obtaining the printout, it is possible to: disable the function using the *StA OFF option* (*YES* or *n0*) or continue measurements: *StA on* .

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 weighments,

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 %.

To end work with the function and simultaneously reset the result register, press the *MENU key* and then, while *StAt* and *Sta oFF* press the *ENTER key.*

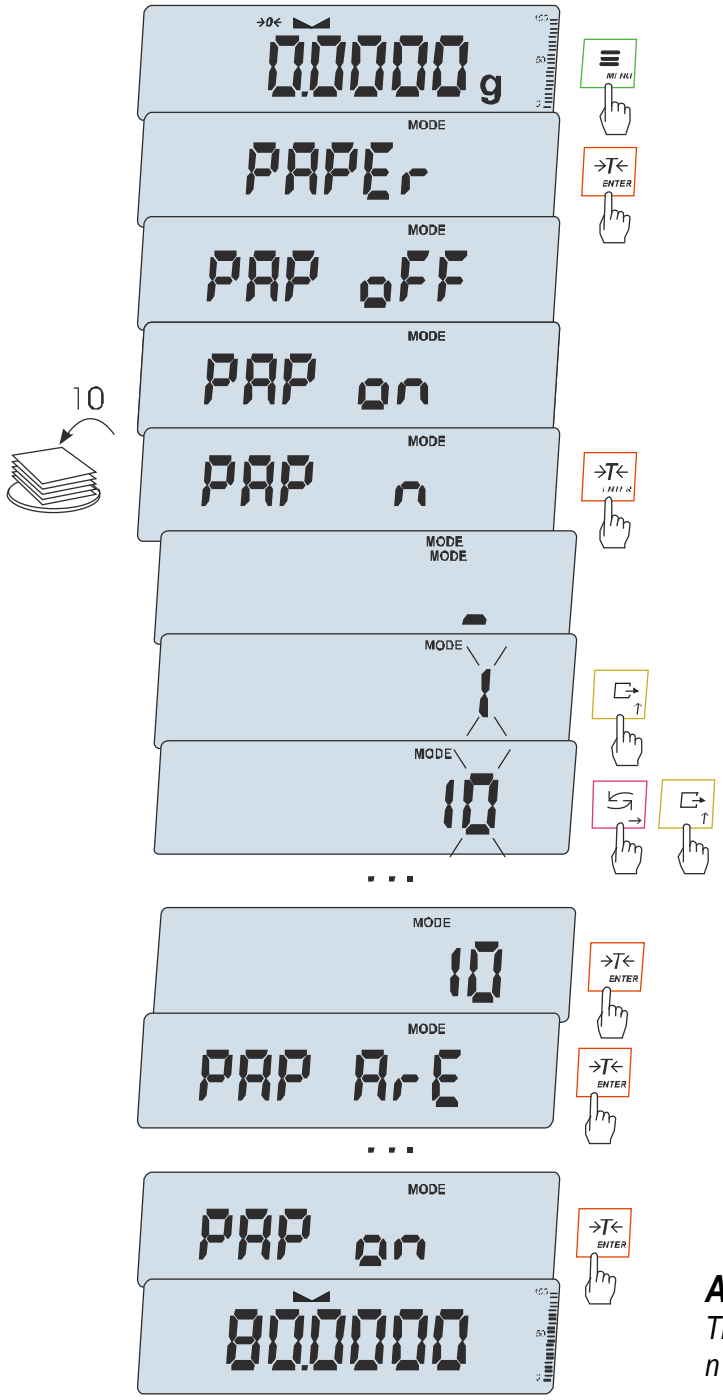
Print form :

```
------------- 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
```

Attention:

When connected to a computer, after the computer sends the initial signal SA CR LF (53h 49h 0Dh 0Ah), the scale sends statistical data contained in a histogram to the computer.

18.1 3 Paper weight determination function (PAP Er) - option



This function allows you to calculate the mass of 1 m ^{2} of paper based on a sample of several pieces of known area.

T ←key →.

Place a sample of one or more pieces of paper on the weighing pan (make sure that the total load is not less than 100 scale reading divisions).

Press *the MENU key* to call up the function menu. Select the *PAPEr function* .

The display will show the following:

- *PAP oFF* – function deactivation
- *PAP on* – basis weight measurement in g/m ^{2}
- *PAP n* – entering the number of pieces placed on the pan
- *PAP ArE* – entering the area of a single section in ^{m2}

Entering *PAP n* i *PAP ArE* is performed using the navigation keys.

Press the →*T key* ←while the display shows *PAP on.*

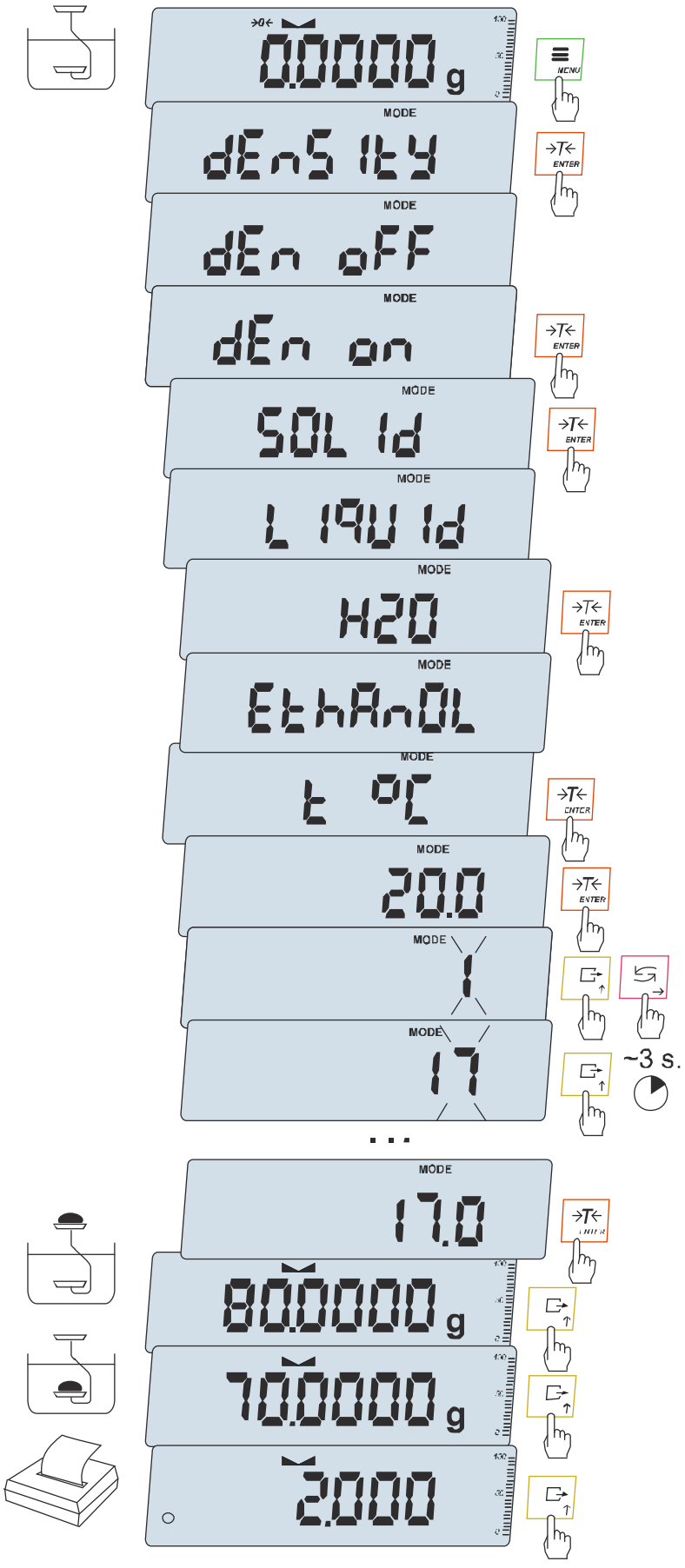
The scale will indicate the paper weight in g/m2 , which is indicated by the "o" sign on the left side of the display .

To end the function, press the *MENU key* and then, using the →*T key* ←, select *PAPEr* and *PAP oFF* .

Attention:

The message "PAP Err " means that incorrect PAP n or PAP ArE. values have been entered.

18.1 4 Determining the density of solids and liquids (dEnSItY)



Determining the density of a solid

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

$$g = \frac{m_1}{m_1 - m_2} * g_{\text{of liquid}}$$

where: m_1 - mass in air
m_2 - mass in liquid

For distilled water (H_2O) and spirit (*EthAnOL*), as the most frequently used liquids, the g value of the liquid is calculated automatically, taking into account the temperature. The temperature value should be entered with an accuracy of 0.5 °C.
To enter, use the keys:

↑ - increasing the value of the entered digit,

↓ - decreasing digit, longer held - decimal point,

→ - move to the next digital position,

ENTER - end of typing

For other liquids (*othEr*), enter the density value of the liquid directly, taking into account its dependence on temperature.

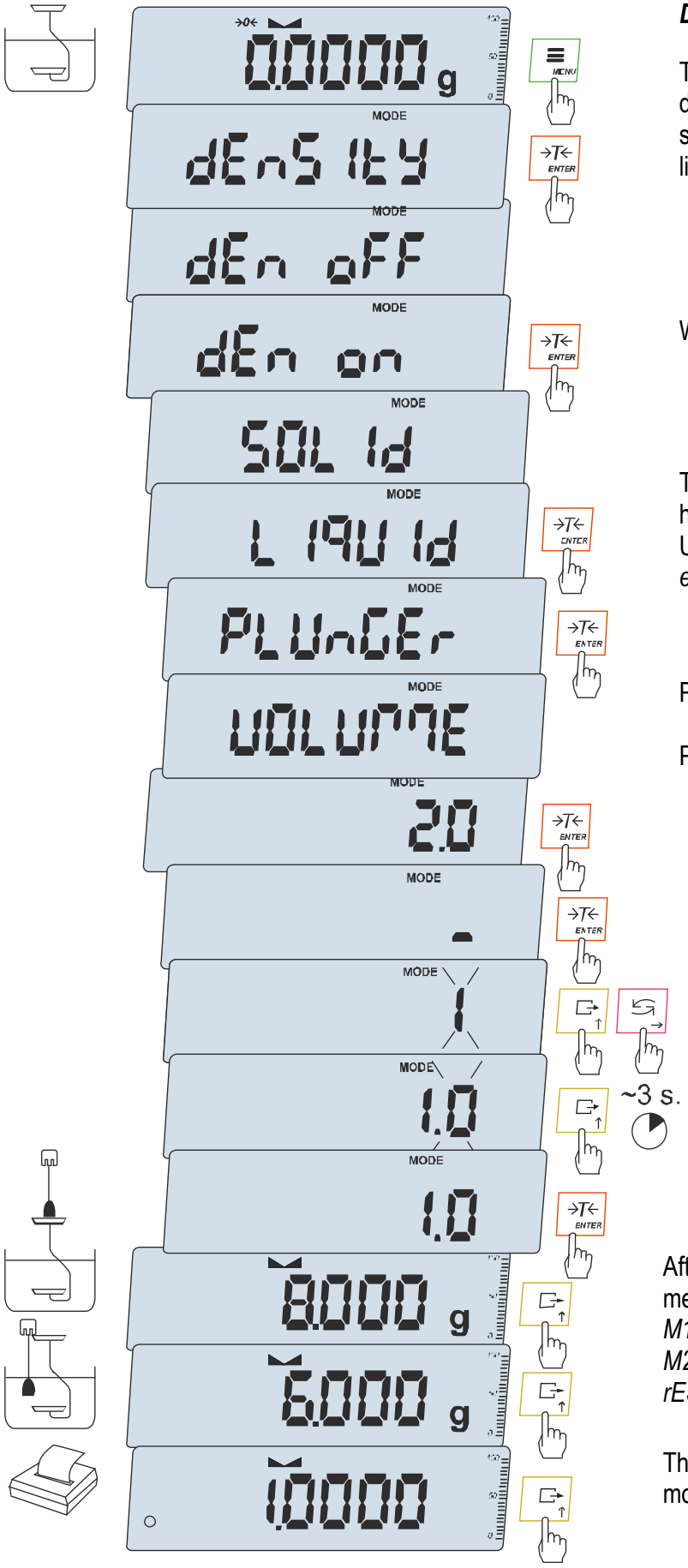
Phase I: Measurement in the air
Phase II: Measurement in liquid

After pressing the key, the following messages appear:
M1 – mass in air,
M2 – mass in water,
rESULt – density measurement result.

The last key press prints the result and moves to the next density measurement.

If a printer is connected to the scale, the solid density measurement results will be printed in the following form:

Date: ...	Time. ...
MEASUREMENT NUMBER	= ...
MASS in the air	= ...g
MASS in liquid	= ...g
MASS DENSITY	= ...g/ cm^3
Liquid density	= ...g/ cm^3
Liquid temperature	= ... ^oC



Determining the density of liquids

The function allows you to determine the density of a liquid based on the weight of a sinker with a known volume in air and the liquid being tested based on the formula:

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

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.
Use the navigation keys and *ENTER to enter the volume value* .

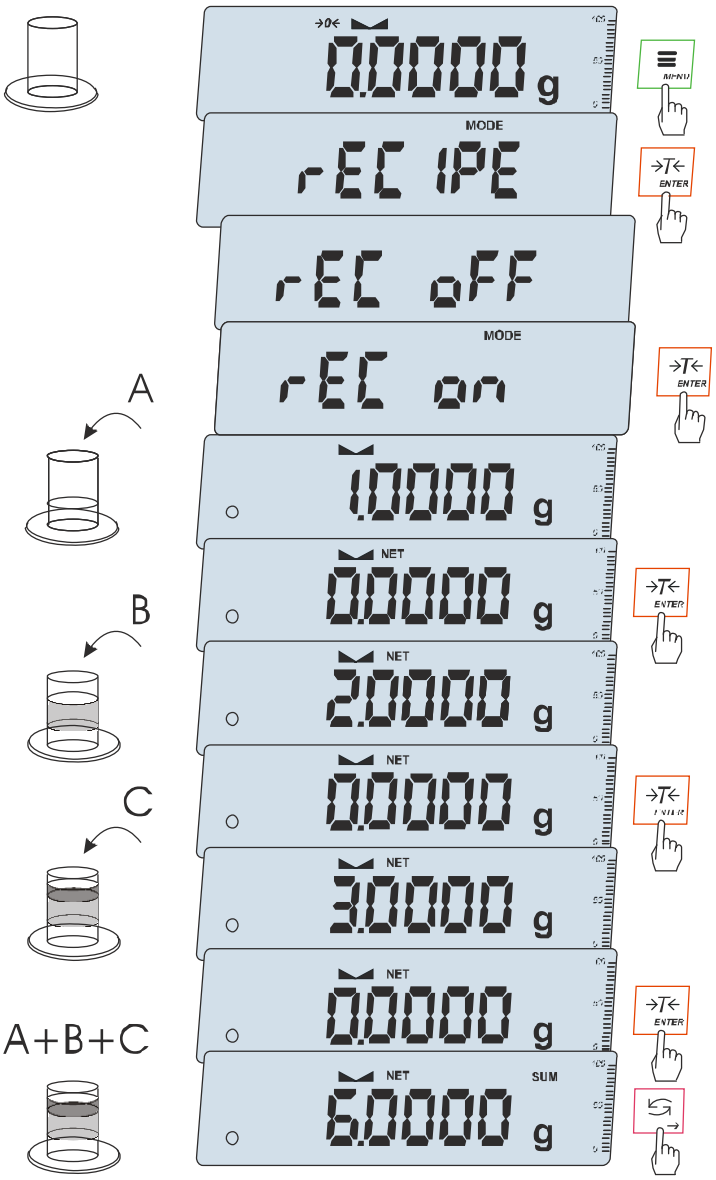
Phase I: Measurement in the air

Phase II: Measurement in liquid

After pressing the key, the following messages appear:
M1 – mass in air,
M2 – mass in water,
rESULt – density measurement result.

The last key press prints the result and moves to the next density measurement.

18.1 5 Recipe ingredients sum function (rECIPE)



This function allows you to weigh several ingredients separately in one vessel with the ability to read the total weight of all ingredients weighed so far.
The function has the following options:
- *rEC oFF* – exit from the function with the ability to read the total mass
- *rEC on* – start of recipe execution
- *rEC Con* – continuation of the previous recipe,
- *out* – exit without changes.

When making a recipe, subsequent ingredients (A, B, C, etc.) are weighed, each time starting from zero, which is achieved by taring the scale. After weighing several ingredients, it is possible to read their total weight (despite the taring). To do this, use the key or ↻ *the rEC oFF* option . Using the key again ↻ allows you to quickly return to the recipe.
To finish working with the function, press the *MENU key* and then, using the *ENTER key* , select *rECIPE* and *rEC oFF* .

Comments:
The o sign on the left side of the display indicates that the *rECIPE function is active* .
The SUM character that appears after using the *rEC oFF option* disappears when the *→T key is used again ←.*

19. Maintenance and removal of minor damage

1. Keep the scale clean.
2. Be careful not to let any dirt get between the pan and the housing while using the scale. If contamination is found, remove the pan (lift it up) and remove the contamination.
3. In the event of incorrect operation caused by a short-term power outage, disconnect the power supply plug from the scale and then plug it in again after a dozen or so seconds.
4. Any repairs by unauthorized persons are prohibited.
5. To repair the scale, please contact the service point specified in the warranty or use the list of authorized service points at *www.axis.pl.*
6. Damaged scales may be sent for repair as courier shipments only in the original packaging. For transport, the weighing pan must be protected against accidental pressure. Otherwise, there is a risk of damaging the scale and voiding the warranty.

Emergency messages:

Announcement	Cause	Recommendation
C-1...6 (over 1 min.)	negative self-test result	if the message remains, contact the service center
L	missing pan	put the pan on
	mechanical damage to the scale	report to the website
H	weight overload	remove the load from the scale
	mechanical damage to the scale	report to the website
UnLOAd	load left on the pan	remove the load from the pan
SerVICE	mechanical damage to the scale	report the scale to the service center
indicator doesn't work ◣◢	unstable positioning of the scale, ground vibrations, gusts of air	place the scale in a place that ensures stable readings
	scale damage	report to the website
- - - - - -	Taring not completed	as above

Notes