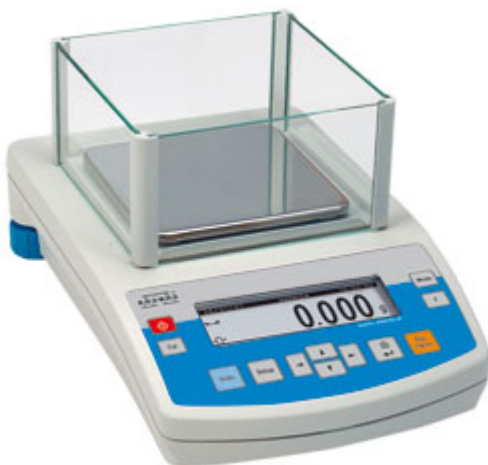


# User manual

Number:  
LMI-38-02/07/11/ENG

## Balances Series PS/X



### MANUFACTURER OF ELECTRONIC BALANCES

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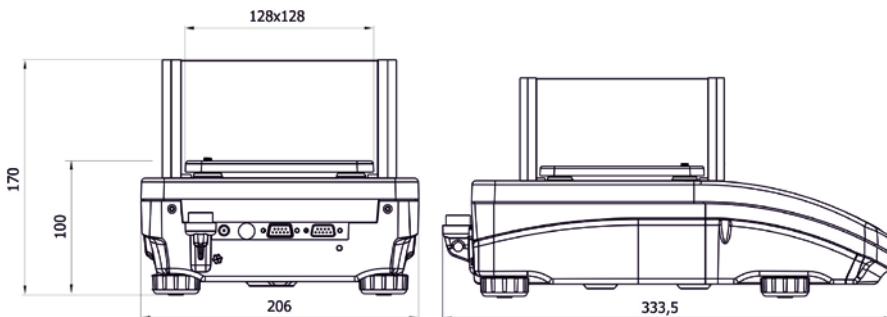
## 1. TECHNICAL PARAMETERS

### Balances series PS/X with pan 128 x 128 mm:

	PS 200 / 2000/X	PS 250/X	PS 450/X	PS 750/X	PS 1000/X
Max capacity	200 / 2000g	250g	450g	750g	1000g
Tare range	-2000g	-250g	-450g	-750g	-1000g
Min capacity	0,02 g	0,02 g			
Accuracy	0,001/0,01 g	0,001 g			
Repeatability	0,001/0,01 g	0,001 g		0,0015 g	
Linearity	± 0,002 / 0,01g	± 0,002 g		± 0,003 g	
Temperature	+10 °C ÷ +40 °C				
Supply	Adapter 110-230V AC/ 50-60Hz /13,5-16 V DC				
Sensitivity drift	2 ppm/°C in temp. +15°C - +35°C				
Pan size	128 x 128mm				
Max ambient humidity	80 % *				
Min ambient humidity	35 % *				

\* - when any problems with electrostatics occurs humidity of air should be increased to 50%, but when it is not possible to keep 50% humidity the ionizer should be used to eliminate electrostatic effects on balance indications.

### Dimensions:

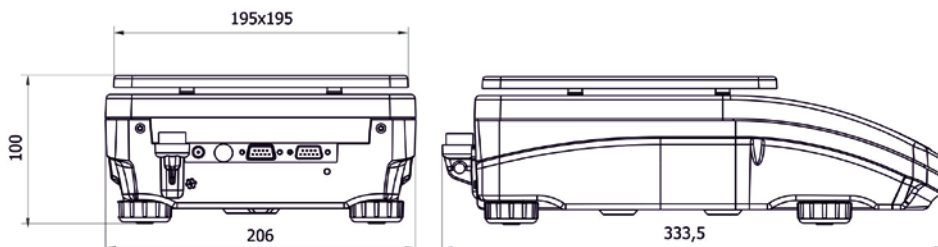


## Balances series PS/X with pan 195 x 195 mm:

	PS 1500/X	PS 2500/X	PS 4500/X	PS 6000/X	PS 8000/X
Max capacity	1500g	2500 g	4500 g	6000 g	8000 g
Tare range	-1500g	-2500 g	-4500 g	-6000 g	-8000 g
Min capacity	0,5 g				
Accuracy	0,01 g				
Repeatability	0,01 g			0,015 g	
Linearity	± 0,02 g			± 0,03 g	
Temperature	+10 °C ÷ +40 °C				
Supply	Adapter 110- 230V AC/ 50-60Hz/13,5-16 V DC				
Sensitivity drift	2 ppm/°C in temp. +15°C - +35°C				
Pan size	195 x 195mm				
Max ambient humidity	80 % *				
Min ambient humidity	35 % *				

\* - when any problems with electrostatics occurs humidity of air should be increased to 50%, but when it is not possible to keep 50% humidity the ionizer should be used to eliminate electrostatic effects on balance indications.

### Dimensions:



## 2. BASIC INFORMATION

### 2.1. Appropriation

Precise balance is used to precise measurement in laboratory conditions. It can be used as non-automatic balance. Load should be placed in the middle of pan. Result should be read after balance reaches stability.

## **2.2. Conditions of use**

Balance cannot be used for dynamical weighing even if small load are addend or deducted from main load. Result should be read after balance reaches stability. Do not put magnetic loads on pan. It can cause damage of system. Avoid dynamical weighing and overloading. Remember that tare mass (container) should be deducted from capacity. Do not use balance in explosion risk environment. No construction modifications can be made in balance.

## **2.3. Guaranty**

Guaranty policy cannot be related to following cases:

- When user does not follow manual instructions,
- When balance is used in different way that it is assigned for
- When modifications were made or case was open (protective sign is damaged),
- When mechanical or any damages were caused by water, other liquids, long usage,
- When balance is set incorrectly or there is damage of electrical system,
- When mechanism is overloaded.

## **2.4. Control over metrological parameters**

Metrological features should be checked in fixed periods of time. Frequency of checking depends on environmental conditions, weighing procedures and quality control system.

## **2.5. Information in user manual**

Read the manual very carefully before start balance.

## **2.6. Training**

Balance should be operated by trained and qualified professionals.

## **3. TRANSPORT AND STORAGE**

### **3.1. General checking**

Check condition of package and balance immediately after delivery.

### **3.2. Package**

Please keep all elements of package to use them for transport in the future. Only original package can be used for transport. Before packing remove all movable elements (pan, washer, pads). Put all elements in protective package before transport.

## **4. UNWRAPING, INSTALATION AND CHECKKING**

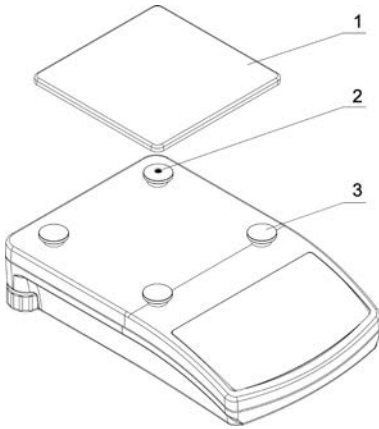
### **4.1. Place of installation, place of usage**

- Keep and use balance in room free of vibrations, dust and drafts,
- Temperature of air should be in range of:  
+10 °C ÷ +40 °C
- Changes of temperature should not be higher than 3 °C during an hour,
- Balance should be replaced on wall desk or stable table far from heat sources or vibrations ,
- Strong magnet is a part of balance. Magnetic load should be weighed with care to avoid negative effect on result. It is recommended to weight magnetic loads under balance using a set and suspension under base.
- If static electricity has got influence on balance indications its base should be grounded. Grounding screw is at the back of base.

### **4.2. Unwrapping**

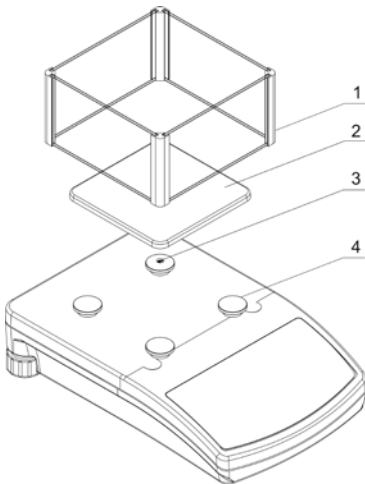
Take balance out off package, take plastic protection pads off and put balance gently in the place of usage.

Assembly of elements in balance with capacity 10 mg:



- Take protection tape off one of rubber bumpers (2),
- Put pan on (1) rubber bumpers (3),
- Check if pan lays on bumpers.

Assembly of elements in balance with capacity 1mg:

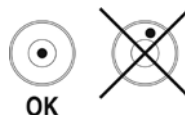


- Take protection tape off one of rubber bumpers (3),
- Put pan (2) on rubber bumpers (4),
- Put glass shield (1) on balance,
- Check if pan lays on bumpers

*Draw. 1. Assembly of elements in balance PS/X*

### 4.3. Leveling

Balance should be leveled before usage. Air bubble should be in the Centre position of level indicator.



### 4.4. List of standard elements

- Balance
- Pan and elements
- Supplier
- Manual on CD.

### 4.5. Cleaning

Balance should be cleaned with gentle damp cloth. Remember to remove pan during cleaning.

**NOTICE!!!**

**Balance can be damaged when pan is still on balance during cleaning.**

### 4.6. Connection to supply

**Balance should be supplied via original adaptor only which balance is equipped with. Voltage on control label of balance must be the same as voltage of supply.**

Switch supply on – supply socket is at the back of balance. Display shows name and number of software and then 0.000g (for balances with capacity 1mg) or 0.00g (for balances with capacity 10mg). If indication is different to zero, press **ZERO/TARE**.

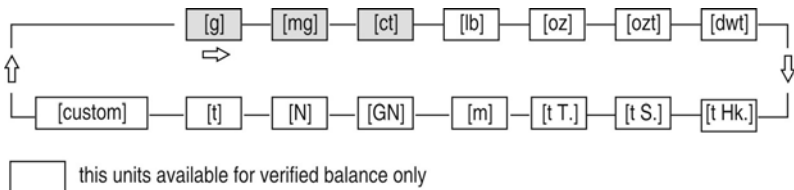
### 4.7. Connection of additional equipment

Only recommended by producer equipment can be connected to balance. Before connecting additional equipment or change (printer, computer PC, keyboard PS/2) switch supply off.

Switch supply on after installation.

## 5. BASIC FUNCTIONS

There are following mass units:



*Draw. 2. Mass units*

There are additional functions in balance:

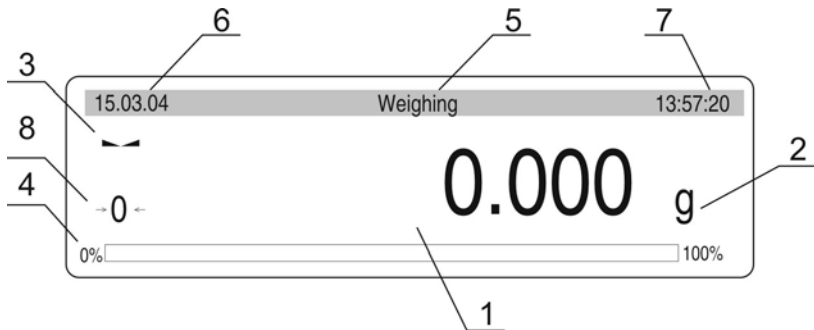
- counting pieces
- checkweighing
- dosage
- deviation determination
- weighing animals
- density of solids and liquids determination
- mixture preparation according to recipes
- statistics preparation

Mass units and functions can be inaccessible for user. Balance can be adapted to individual needs, functions and units can be available when they are needed.

Selection available/not available can be made in user menu and it is described in further part of manual.

## 6. DESCRIPTION

### 6.1. Graphic display

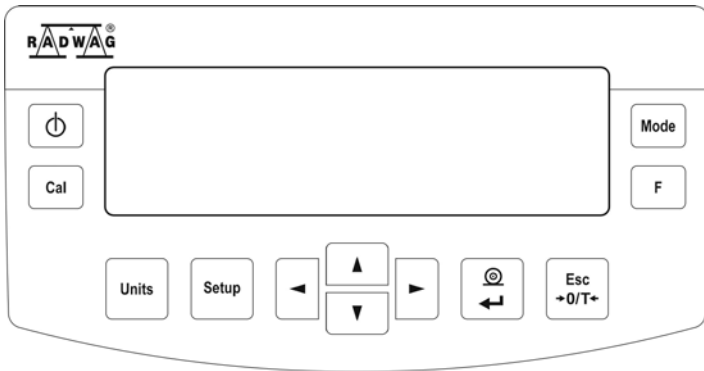


*Draw. 3. Display view*

1. Mass or quantity of pieces
2. mass unit
3. result is stable
4. „BARGRAF” which shows what part of mass is used
5. Inscription which informs in what mode balance is in
6. current date
7. current time
8. balance shows precise ZERO

## 6.2. Keyboard

Each key is double function key, its for assigned function and its used to move in balance menu.



Key **ON/OFF**, switches on/off display. When display is switched off balance is in “stand by” mode.



**F** is function key, setting in work mode



Key **MODE** – work mode selection.



Key **UNITS** to select mass units



Key **PRINT - ENTER** – send indication to external device (PRINT) or confirm selected value of parameter or function (ENTER).



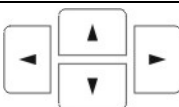
Key **ESC - ZERO/TARA**



Start of adjustment/calibration

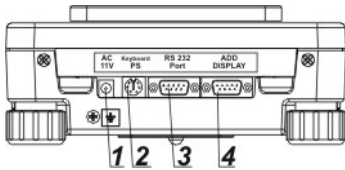


Entering main menu



Direct keys to move in menu or change parameters

### 6.3. Sockets



1. socket
2. computer keyboard socket PS/2
3. port RS 232
4. additional display socket

Draw. 4. Connections in PS/X

## 7. USER MENU

There are 9 groups in user menu. Each group is named by P letter. Name and contents of each group is presented below.

### P1 Calibration

01	Internal calibr.	* * * * *	function
02	External calibr.	* * * * *	function
03	User calibr.	* * * * *	function
04	Calibr. test	* * * * *	function
05	Weight corr.	0.0	
06	Auto calibr.	3	both
07	Auto cal time.	3	3 hours
08	Print report	1	on

### P2 GLP

01	User	Nowak Jan	
02	Project	AR – 65/04	
03	Time print	0	off
04	Date print	0	off
05	User print	0	off
06	Project print	0	off
07	Id Print	0	off
08	Calibr. print	0	off

### P3 Date/Time

01	Date format	0	D/M/R
02	Time format	0	24 h
03	Time	* * * * *	function
04	Date	* * * * *	function
05	Disp. time	1	on
06	Disp. date	1	on

#### P4 Readout

01	Filter		3	middle
02	Value release		1	fast+rel.
03	Disp.refresh		1	0.08 s
04	Autozero		1	on
05	Last digit		1	always
06	Negative		0	off

---

#### P5 RS - 232

01	Baud rate.		1	4800
02	Parity		0	none
03	Data bits		2	8 bits
04	Stop bits		1	1 bit
05	Handshake		0	none
06	Auto print		0	none
07	Interval		1	* 0.1 s
08	Min. mass		4	10 d
09	Print on stab		1	on
10	Printer type		0	standard
11	Cut paper		0	no

---

#### P6 Printout

01	Printout number		0	standard
02	Pr. 1 start		1	
03	Pr. 1 stop		1	
04	Pr. 2 start		1	
05	Pr. 2 stop		1	
...	.....			
10	Pr Edit		*****	function
11	Text 1			
11	Text 2			
...	.....			
90	Text 80			

---

#### P7 Units

01	Grams		1	on
02	Milligrams		1	on
03	Carats		1	on
04	Pounds		1	on
05	Ounces		1	on
06	Ounce troy		1	on
07	Dwt		1	on

08	Taele Hk.		1	on
09	Taele S.		1	on
10	Taele T.		1	on
11	Momms		1	on
12	Grains		1	on
13	Newtons		1	on
14	Ticaal		1	on
15	Custom		1	on
16	Custom factor		1.0	

---

### P8 Work modes

01	Counting pieces		1	on
02	Checkweighing		1	on
03	Dosage		1	on
04	Percent		1	on
05	Animal weighing		1	on
06	Density		1	on
07	Formulation		1	on
08	Statistics		1	on

---

### P9 Global

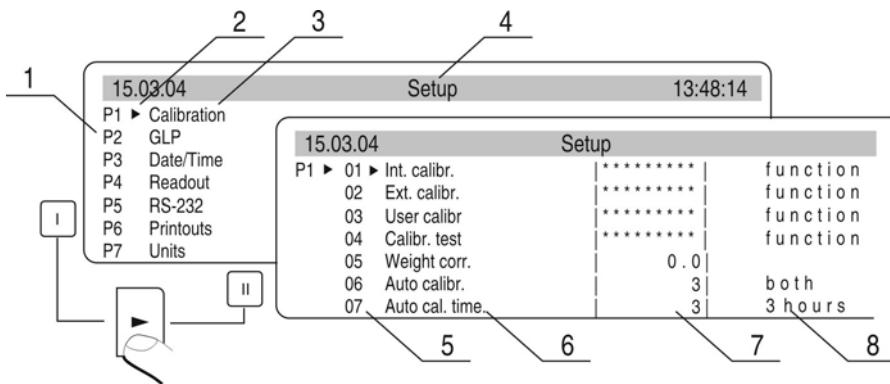
01	ID Setting		*****	function
02	ID Autoprint		0	off
03	Beep		1	enabled
04	Language		1	Polish
05	Backlight		1	on
06	Brightness		*****	function
07	Contrast		*****	function
08	Screensaver		0	no
09	Temperature		*****	function
10	Balance Id		114493	
11	Software rev.		MBS w.04	
12	Par. printout		*****	function
13	Receive par.		*****	function
14	Password protection		*****	function

### Parameters in user menu are:

- functional – for particular activity eg. the balance calibration
- selectable – selects one of few values from the balance memory like: refreshing, screensaver, units mass declaration, function declaration.
- noted – changes sets in the balance memory eg. Date, time, user number, texts.

## Menu – graphic version

Press the **SETUP** key to display main menu of the balance (display I). Select the submenu whose contents is displayed after pressing the **RIGHT ARROW** key (display II).



Draw. 5. Menu view

- 1 – main menu number
- 2 – indication of the function selection
- 3 – function name
- 4 – currently used function
- 5 – submenu number
- 6 – submenu name
- 7 – attribute of the menu
- 8 – value of the attribute

## 7.1. Moving in user menu

User moves in the menu by

- the balance keyboard
- PS keyboard,
- Communicates from computer to the balance

### 7.1.1. The balance keyboard



enter main menu



move down in the menu



move up in the menu



selects submenu which is activated. Submenu contents is presented on the display



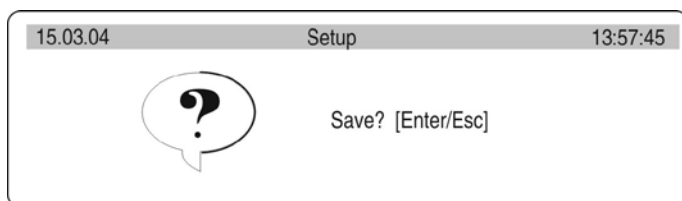
move one level up to main menu



Resignation parameter changing

### 7.1.2. Return to weighing function

Introduced changes are recorded after return to weighing mode and confirm changes. Press the ESC key many times. If following question appears on the display press: ENTER – confirm or ESC – cancel.















*Draw. 6. Return to weighing*









### 7.1.3. PS/2 computer keyboard

Each key on the balance keyboard has its equivalent on the PS keyboard:





#### - for functions

	Description	Keyboard
	Switch on/off the balance display	
	Move to the balance menu	
	Selects work mode	
	Selects measure unit	
	PRINT	
	TARE	

#### - for direction keys

	Move up	
	Move to level up	
	Sets selected parameter	
	Move down	

- for ENTER / PRINT keys and ESC

	Confirm changes	
	Cancel and leave function without changes	

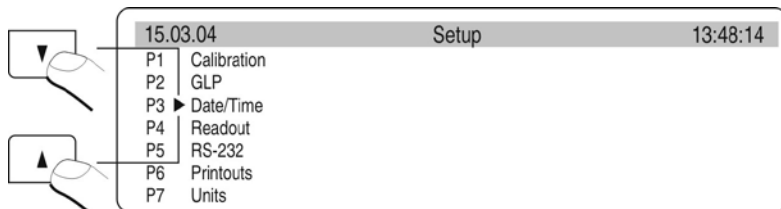
#### 7.1.4. By means of virtual keyboard through RS 232

Most of the functions are done by the balance desk or PS keyboard. They are also done by sending orders computer – balance.  
This commands enables to move in the balance menu and control the balance work. The list of the commands is at the end of the manual..

#### 7.2. User menu

The user menu is presented in p. 6.

Press **Setup**, main balance menu is displayed. Select the submenu which is modified.

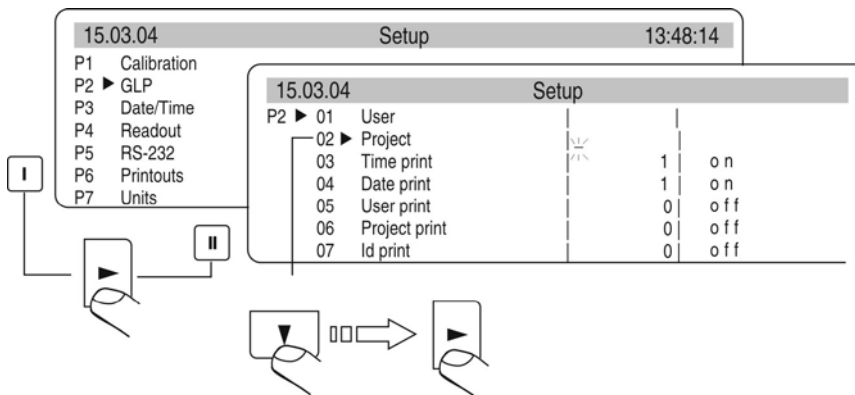


*Draw. 7. Main menu – submenu selection*

If the menu is modified press the **RIGHT ARROW** key. Selected menu appears on the display. Select what will be changed in this submenu (activate). Select through keys presented on the Draw above. Press the **RIGHT ARROW** key.

Reaction of the balance:

- Activity of the balance (eg. the balance calibration) is done for submenu described as Function
- Attribute activation for submenu which is indicated (digit flashing means the value can be changed and some signs can be written)




Draw. 8. Submenu –selection keys

## 8. WEIGHING

Following conditions must be fulfilled to get reliable results:

- Stable temperature
- Stable ground
- Proper parameters for external conditions

1 Before measurements or for essential changes of the external conditions (if the temperature changes more than 1° C/h) calibrate the balance in accordance with p. 8.1.

2 Before measurements load the pan and check if the balance show „precise zero” – displayed →0← in down left corner of the display (only if the parameter P4 06 Autozero has the value 1: yes) and check if the measurement is stable –  is displayed in right up corner of the display. If the balance does not show zero press the key

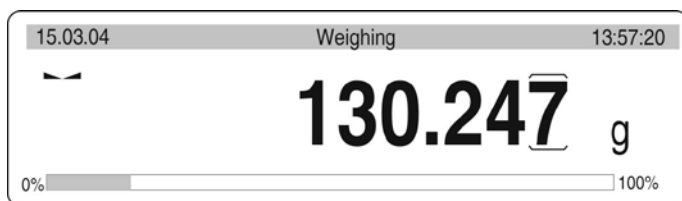
Esc  
→0/T←

3 If the conditions are unfavorable (no stable result) lines appear on the display. After settled time the balance returns to weighing mode without set up to zero. In this case wait until the conditions stabilize and press

**ZERO/TARA** again.

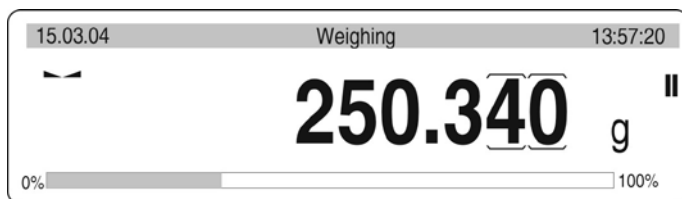
- 4 By the **Units** key select measure unit. Put the load on the pan and after stabilization read out the result. If measure unit user wants to use is not displayed during pressing the **Units** key check if it has access attribute.
- 5 The indication can be set to zero many times. Sum of loads noted in the balance memory cannot be higher than max capacity.
- 6 Between following measurements do not unplugged the balance. The balance should be switched off by the **ON/OFF** key. After pressing the key again the balance is ready to work without warm stabilization.

Balance **PS 200/2000/X** is double range balance. Accuracy of **I range** is  $d_1=0.001\text{g}$ , and of **II range** is  $d_2=0.01\text{g}$ .



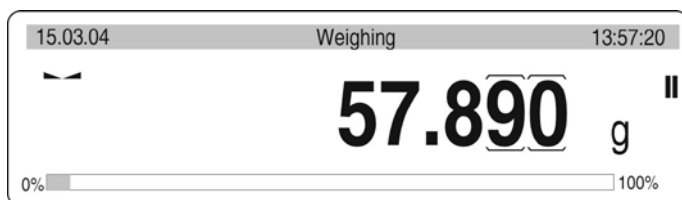
*Draw. 9. Two range balance – result in I range*

Change from **I range** to **II range** is made automatically after balance reaches  $\text{Max}_1$  200g (without operator activity). There is symbol **II** in right side of display and additional sign of digit before last one.



*Draw. 10. Two range balance – result in II range*

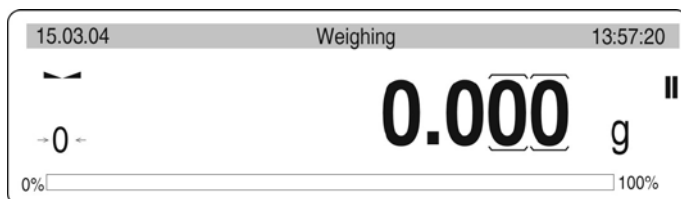
Balance is in II range now.



*Draw. 10-1. Two range balance –result in II range*

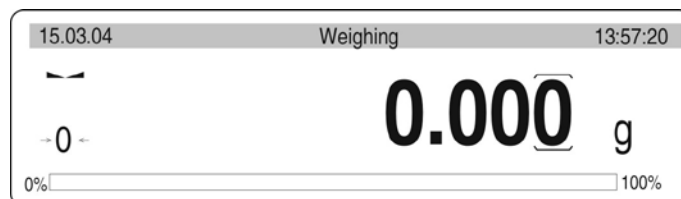
To return to I range:

- Take the load off the pan



Draw. 10-2. Two range balance – result in II range

- When the balance shows zeroes  $\leftarrow 0 \leftarrow$  and  $\blacktriangle \blacktriangleleft$  press  $\leftarrow 0/T \leftarrow$



Draw. 10-3. Two range balance – result in I range

Balance return to weighing procedure with  $d_1=0.001\text{g}$  capacity and sign II disappears and sign before last digit.

### 8.1. Log-in operator function

Operator has got own access password to balance menu. System of passwords is defined by balance administrator. Password contains max 6 digits.

**Following options can be declared in software:**

- One administrator who has got access to all settings and functions and can change user and administrator's passwords
- One user who has got access to all setting and functions selected by administrator

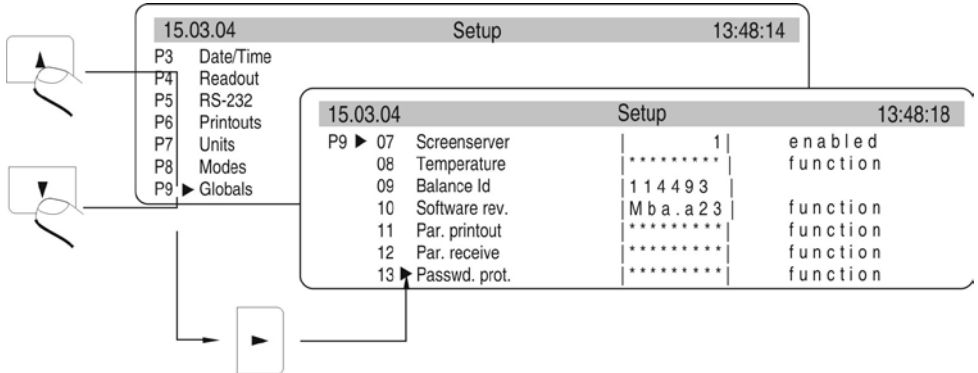
#### Access passwords setting

- Remember to enter administrator password after get in password and access setting (parameter P9 14)
- Software asks for administrator password when entering parameter P9 14, only when administrator password is different from „0“.
- Every enter this parameter the software demands administrator password, after writing correct password it is possible to set the parameter P9 14 Password protection

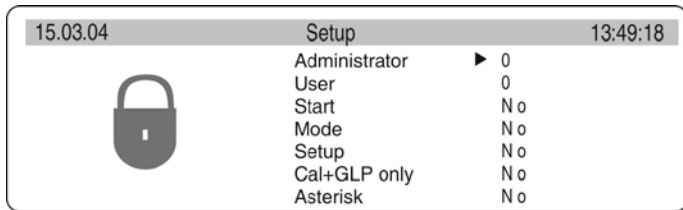
If password is not correct error command appears and balance returns to previous window

- *Dependently on setting the password is shown as digits or stars (start value each digit = 0)*

According to p. 6.1.1 of the manual enter the menu **P9 Global**



Draw. 11. Password – activation the function



Draw. 11-1. Menu password protection

- **Administrator**  
line to write administrator who has access to all set up
- **User**  
line to write user password. User who has access to setting with YES attribute (are not protected by password)
- **Start up**  
If it is settled on YES during start the balance up user must write access password (administrator or user)
- **Functions**  
If it is settled on YES (not protected by password) user can use implemented functions in the balance.
- **Set up**  
If it is set up on YES (not protected by password) user can change setting in the balance
- **Only Cal + GLP**  
If it is set up on YES user can perform the calibration and calibration report

- **Stars**

- If it is settled on YES during start the balance up password is hidden under stars

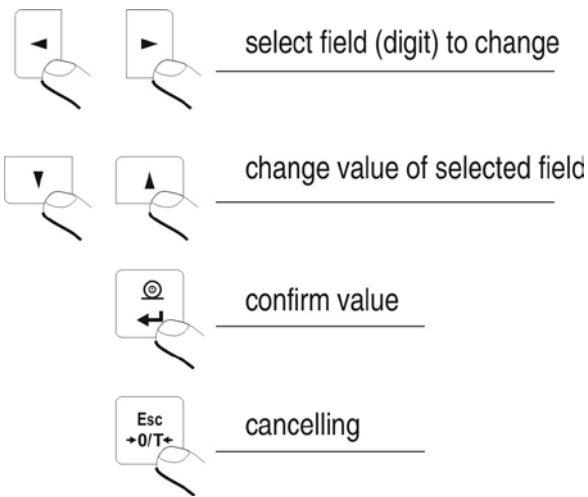
**Administrator password**

Write the password for administrator (max 6 digits) and user. Each administrator has access to all functions in the balance. User has access to balance possibilities in accordance with above description. Please, remember the password. If you set YES for „Start up” function the password must be written after switch the balance on.

If the password is not correct using the balance is not possible.

To write the password in use keys described on the drawing 2. or PS/2 keyboard (it can be connected to the balance port).

Set up the attributes for other options dependently on authorizations for user.



Draw. 12. The keys – introducing the values in the menu

**9. BALANCE CALIBRATION**

To ensure high precision of weighing corrective factor in relation to standard mass must be noted in the balance memory periodically – it is the balance calibration.

**Calibration should be performed when:**

- The weighing is started,
- Long breaks are between following measure series

- Temperature inside the balance changes more than: 1°C

### Kind of calibration

- Internal automatic calibration
  - \* started if temperature changes, started if the time changes
- Manual internal calibration
  - \* started by the balance keyboard (CAL key)
- Calibration made with external weight (for not verified balances only)
  - \* with declared mass which cannot be modified
  - \* with any mass which should be given before the calibration process

*In verified balances only automatic internal calibration and manual internal calibration is accessible.*



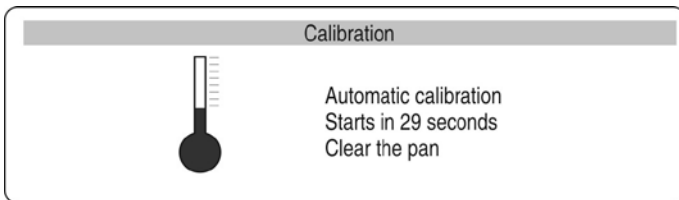
Perform the calibration when there is no load on the pan!

#### 9.1. Automatic calibration

It is performed when:

- Period of time passes from last calibration
- temperature changes for settled value by manufacturer

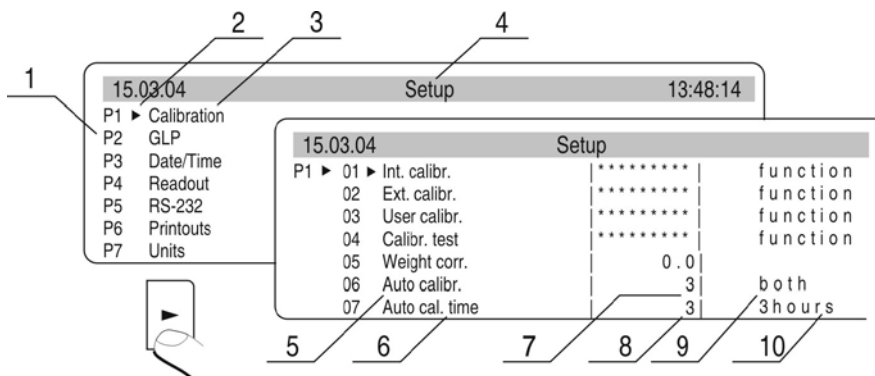
Following information appears on the display:



*Draw. 13. automatic calibration – display*

Time delay in starting the calibration up enables user to take load off the pan until the measurements are performed. If the T/O key is pressed the calibration process is stopped. Calibration is restarted after about 5 min.

## Set up automatic calibration



Draw. 14. Set up automatic balance calibration

- 1 – main menu number
- 2 – function selection factor
- 3 – function name
- 4 – name of actual activity
- 5 – selects factor to auto calibration (time / temp.)
- 6 – declaring auto calibration time
- 7 – value of factors for auto calibration
- 8 – value of time for auto calibration

if the values for factor and auto calibration time also descriptions for them changes (on the drawing field No 9. and No 10.)

### 01 Internal calibration

Start internal calibration process, the process is automatically without operator interference, if there is load on the pan the display shows order to remove the load

### 02 External calibration

calibration performed by external mass, its value is recorded in factory menu, function inadmissible in verified balances

### 03 User calibration

calibration performed with any mass which must be introduced before the calibration, function inadmissible in verified balances

### 04 Calibration test

comparison internal calibration mass with its value recorded in the balance memory

## 05 Weight code

correct value of internal calibration mass, function inadmissible in verified balances

## 06 Automatic calibration

determine factor which decides about start automatic internal calibration

- 0 non – non of the factors causes start of the calibration
- 1 time – calibration in relation to time determined in p. 07
- 2 temperature – calibration in relation to changes of surroundign temperature
- 3 both – calibration in relation to changes of time and temperature

## 07 Automatic calibration time

Determination of time automatic calibration starts up

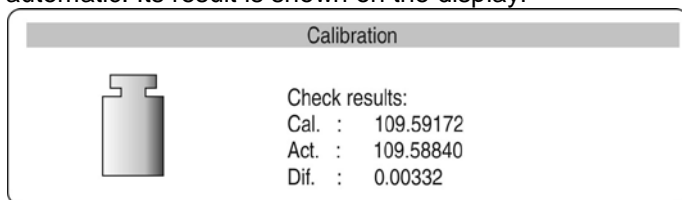
### Return to weighing



The changes are recorded when the balance returns to weighing mode with the recording the changes. Press the ESC many times. Following question appears on the display.  
Select one of the options : ENTER – record / ESC – cancel  
(see. *Draw Return to weighing p. 6.1.2.*)

## 9.2. Calibration tests

Internal calibration mass is compared to its value in the balance memory. This preocess is automatic. Its result is shown on the display.



*Draw. 15. The calibration test*

Cal. – value of internal calibration mass

Act. – result of weighing internal calibration mass

Dif – difference between two values

### Return to weighing

Changes are recorded only after return to weighing mode and confirmation the changes. Press the ESC key many times. Following question appears on the display. Select one of the options: ENTER – confirmation / ESC – cancel.  
(see. *Return to weighing p. 6.1.2.*)

### 9.3. Manual Calibration

#### 9.3.1. Internal calibration

Press key CAL, or

1. Enter submenu P1 – Calibration.
  2. Select the function 01 Internal calibration.
  3. Press the **RIGHT ARROW** key.
  4. The balance performs the calibration automatically. During this calibration do not load the pan.
  5. After this process the balance records results of the calibration in the memory and returns to weighing mode.
- *Pressing the ESC key stops the calibration process*
  - *If during the calibration load is on the pan display show order about error. The calibration process is stopped. After take load off the calibration process is finished.*
  - *If the function DRH is active user cannot stop the internal calibration process.*

#### 9.3.2. External calibration

*The external calibration should be performed with external mass class:*

- F<sub>1</sub> – for balances PS/X

1. Move to submenu P1 – Calibration.
2. Select the function 02 external calibration
3. Press the **RIGHT ARROW** key.
4. Order to take the load off the pan appears on the display (no load on the pan). After yesing load off the pan press the ENTER key.
5. The balance determines mass of empty pan
6. Put load and press the ENTER
7. After the calibration the balance returns to submenu P1 - Calibration
8. Return to weighing – as in the point 6.1.2..



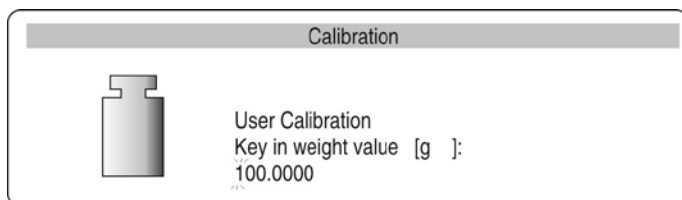
If the function DRH is active user cannot perform the external calibration process. Function DRH is active in verified balances.

### 9.3.3. Calibration performed by user

Calibration performed by user with external weight class

- F<sub>1</sub> – for balances PS/X

- Enter menu group P1 Calibration. Select the parameter 03 user calibration
- Press the **RIGHT ARROW** key. The balance displays order to note calibration mass. The first digit flashes and it can be changed



*Draw. 16. User calibration – declaring value of weight*

- Record new external mass by functional keys (in accordance with p. 6.1.1 of the manual)
- Confirm the mass. The balance starts calibration and shows orders on the display.
- The balance determines mass of empty pan and shows order to put this mass
- After put the weight on the pan confirm by the **Enter**.
- After this procedure balance returns to menu to group P1 Calibration.
- In accordance with previous point start weighing mode.



It is recommended to select external calibration mass as its mass would be about  $\frac{3}{4}$  of max balance capacity.



If the DRH function is active user cannot perform the external calibration process.

## 9.4. Calibration report printout

After calibration user can receive the calibration report. The report can be printed on connected printer and sent to computer or recorded in file.

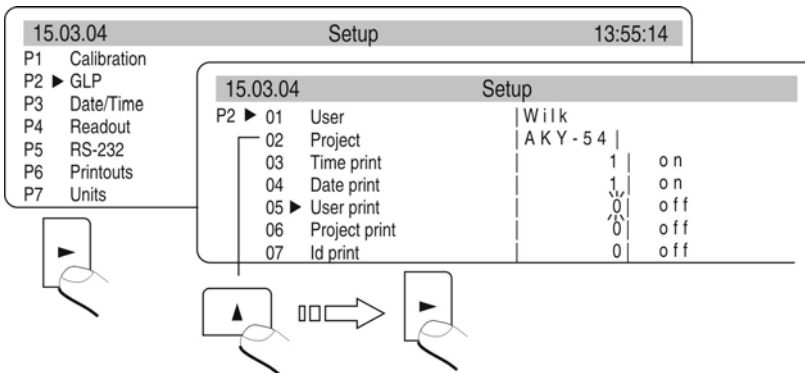
P1 08 Report printout: 1: yes – report is printed  
 P1 08 Report printout: 0: no – report is not printed

If the parameter has the value 1 the report is generated and sent automatically.

15.03.04		Setup	
P1 ▶	02	Ext. calibr.	***** function
	03	User calibr	***** function
	04	Calibr. test	***** function
	05	Weight corr.	0.0
	06	Auto calibr.	3 both
	07	Auto cal. time	3 hours
	08 ▶	Print report	1 on

Draw. 17. Submenu calibration

A content of report depends on setting in submenu GLP. All options with YES attribute are printed.



Draw. 18. Submenu GLP - setting

Apart from information settled in menu group the report contains: calibration mass determined during actual calibration (description: Calibration) and deviation of the calibration (description Deviation:).

```

*** Internal calibration report ***
Date   : 02/09/2008
Time   : 11:21:39
Calibr. : Internal
Difference: - 0.0000[6] g
User Id : Wilk
Project Id: AKY-54

Name .....

```

Draw. 19. Example of balance calibration report

## 10. SETTING PRINTOUTS FOR GLP PROCEDURES

P2 GLP is group of the parameters which declares factors on the calibration printout. For fields:

- user (max 8 alphanumerical signs)
- design (max 8 alphanumerical signs)

introduce names by the balance keyboard or the PS/2 keyboard. For the rest select:

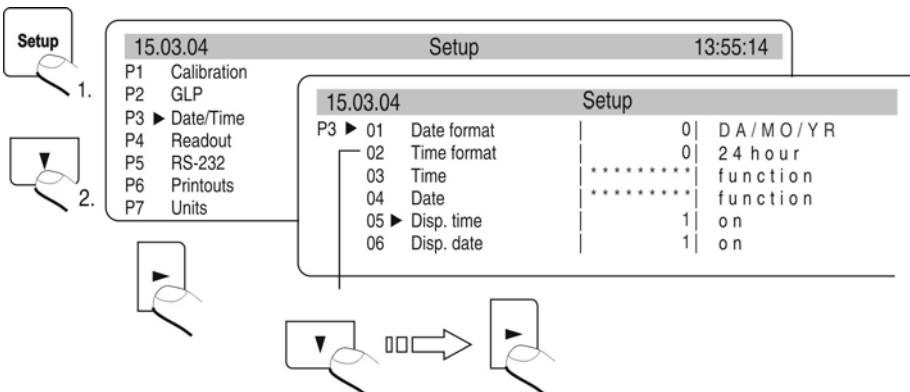
- 1 no (do not print during report)
- 0 yes (print during report)

Main view of submenu GLP is presented in p. 8.

For easier moving and changes use keyboard PS/2.

## 11. SETTING TIME AND DATE

The balance has real time clock whose parameters can be modified. Enter the menu group P3 Date/Time as it is show below.



Draw. 20. Submenu Date/Time

## 01 Date form

There are two possibilities:

- 1 format date Month/Day/Year
- 0 format date Day/Month/Year

After selection proper value confirm by the ENTER key.

## 02 Time form

There are two possibilities:

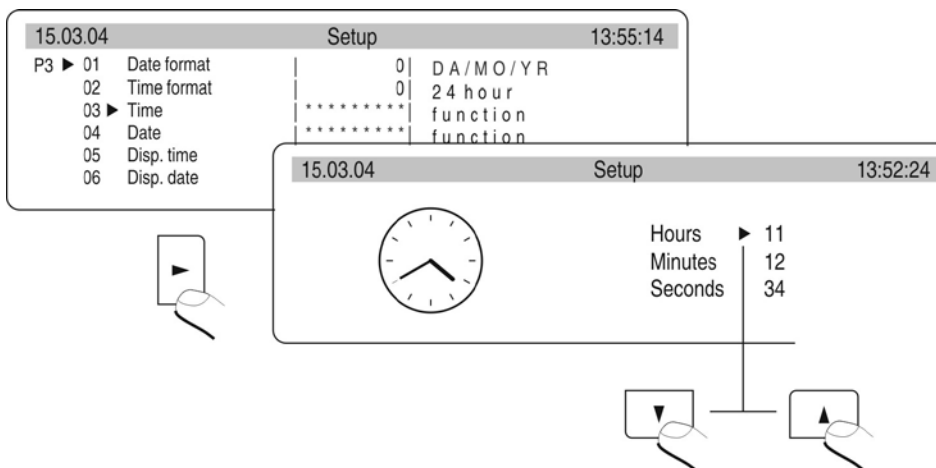
- 1 time form 12 h
- 0 time form 24 h

After selection press the ENTER to confirm.

12 h form is distinguished by the letters PM or AM on the printouts.

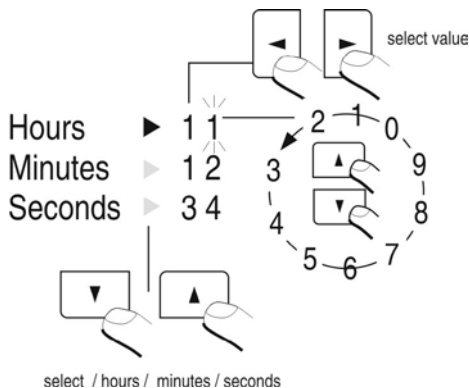
## 03 Time

Enter setting the parameter 03 Time by the **RIGHT ARROW** key in accordance with below scheme.



Draw. 21. Submenu / Time – setting time

Replace the marker next to the value which will be changed (Hour, Minute, Second). Confirm with the **RIGHT ARROW** key. Using UP ARROW and DOWN ARROW change numerical values.



Draw. 22. Submenu Date / Time – setting time – steering keys

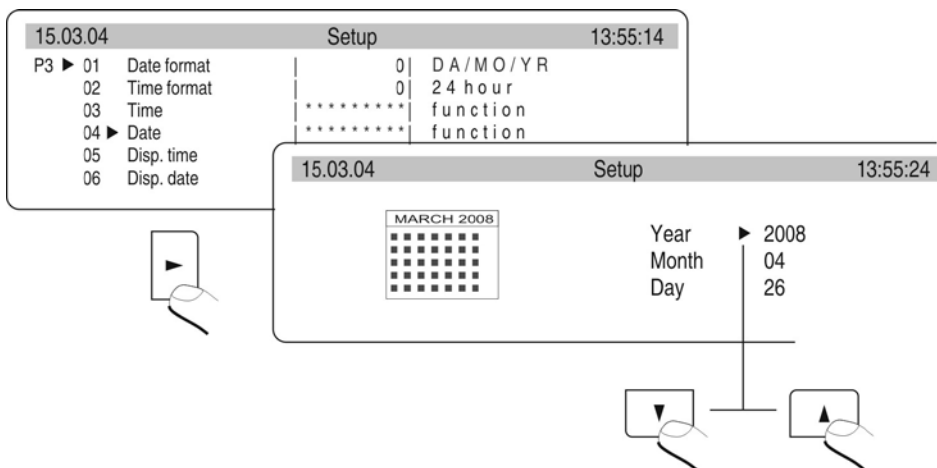
Confirm settled value (last change digit stops flashing)

Repeat all for following values. Press ENTER to confirm. Balance returns to submenu P3 Date/Time and displayed time changes.

Return to weighing mode according to p. 6.1.2.

#### 04 Date

Use **RIGHT ARROW** to enter parameter 04 Date. In accordance with previous description (03 Time) set actual date. After setting date return to weighing mode as it is presented in p. 6.1.2 of the manual.



Draw. 23 Submenu Date / Time – setting date

## 05 Display time

for the value 1 – YES on top graph time is displayed, for the value 0 – NO, time is not displayed..

## 06 Display date

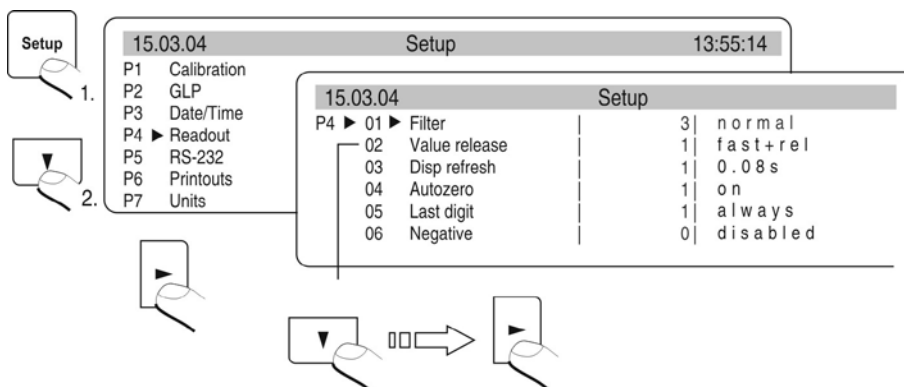
For the value 1 – YES date is displayed on top graph, for the value 0 – NO, date is not displayed.

## Return to weighing

(see. 6.1.2. – Return to weighing)

## 12. SETTING THE PARAMETERS

User can adjust the balance to existing conditions (filter) and own needs (autozero, displaying last digit) by means of parameters in group <P4 Readout>.



Draw. 24. Submenu Readout – internal setting

### 12.1. Filter setting

Dependently on conditions set the filter. If the conditions are conducive set the filter as very fast (value of the parameter 01 Filter 1) and if the conditions are bad (vibrations, draught) set the filter as slowly or very slowly (value of the parameter 01 Filter at 4 or 5). Efficiency of filter is different for range of weighing. The filter works slower during getting to weighed mass. It works faster when mass is the settled filer range (parameter filter range accessed only from service menu – user does not have access).

## **12.2. Value release**

Select and set way for stability result of weighing: fast, fast +reliable or reliable. Dependently on selected option weighing time is longer or shorter.

## **12.3. Display refreshing time**

This parameter determines period of time which the display refreshes in. Information on the display is compared to information which is sent by the balance processor about load on the pan.

For higher values of the refreshing parameter indirect not stable mass indications are not presented on the display during putting on and taking off the load. For low values all changes in mass during weighing are visible – it enables to dosage liquids and solids. The refreshing time is settled in seconds

## **12.4. Autozero function**

To ensure precise indications programmable function „AUTOZERO” is in the balance. This function controls automatically and corrects zero indication of the balance.

If the AUTOZERO function is active each measurement starts at precise zero every time. In special cases this function disturbs in the measurements eg. when the load is put on the pan very slowly (pouring substance). In this case correcting system of zero indication can correct also indication of real load mass.

AUTOZERA is switched on or off in the parameter P4 03 in accordance with p. 6.1.1 of the manual.

## **12.5. Last digit**

To ensure comfort of work with the balance user determines (dependently on needs) if last digit should be displayed and when. One of the following values can be selected:

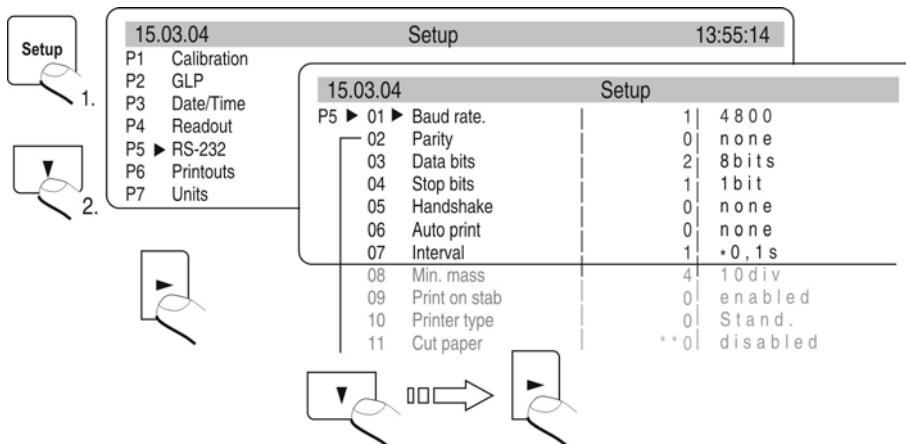
- 0 never
- 1 always
- 2 when stab

## **12.6. Negative**

This function is designed for changes of displaying.

### 13. FUNCTIONS IN USING RS 232 PORT

User can set the parameters necessary for correct communication balance with computer or printer.



Draw. 25. Submenu RS 232 - setting

01 Baud rate	/ 0 : 2400	1 : 4800	2 : 9600	3 : 19200
02 Parity	/ 0 : no	1 : parity	2 : no parity	
03 Data bits	/ 1 : 7 bits	2 : 8 bits		
04 Stop bits	/ 1 : 1 bit	2 : 2 bits		
05 Handsake	/ 0 : no	1 : RTS/CTS	2 : XON/XOFF	
06 Auto print	/ 0 : no	1 : constant	2 : with brake.	3 : when stable
07 Interval				Interval defines how often balance sends inidcation through RS 232 port. It is counted on base on form for the parameter $x 0.1 s = \text{time} - \text{interval}$ ). Value from 1 to 9999 can be written Min mass for automatic work RS 232. Following measurement is sent when result is less than min.
08 Min mass				
09 Print on stab	0 : no	1 : yes		
10 Printer type		Epson or standard		
11 Cut paper		For EPSON printer with this function. After setting on YES paper is cut off automatically.		

After setting correct values return to weighing mode as it is described in p. 6.1.2 of the manual.

## 14. PRINTOUTS

This function is used to make not standard printouts and select type of printout. Precise description for printouts is described in p.18.

## 15. ACCESS TO MASS UNITS

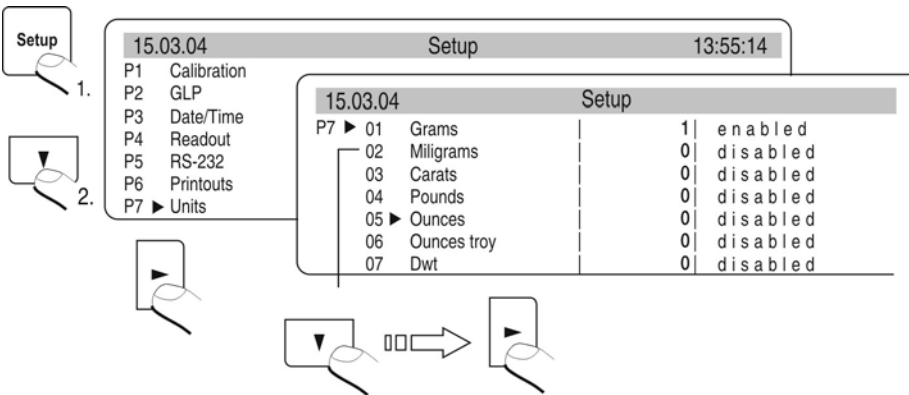
In this group of parameters user declares mass units which are accessible for operator directly under the key **Units**.

All units which value of the parameters is set up at 1: yes are accessible from the level of switching between units.

For units described as 08 Tael Hk., 09 Tael S., 10 Tael T . there are following dependences:

- If all of them have attribute 1: yes the balance show only first of them 08 Tael Hk
- If the measurement is done in units 10 Tael T set the attribute 0 : no for two previous

Enter group of the parameters P7 Units.



Draw. 26. Measure units - setting

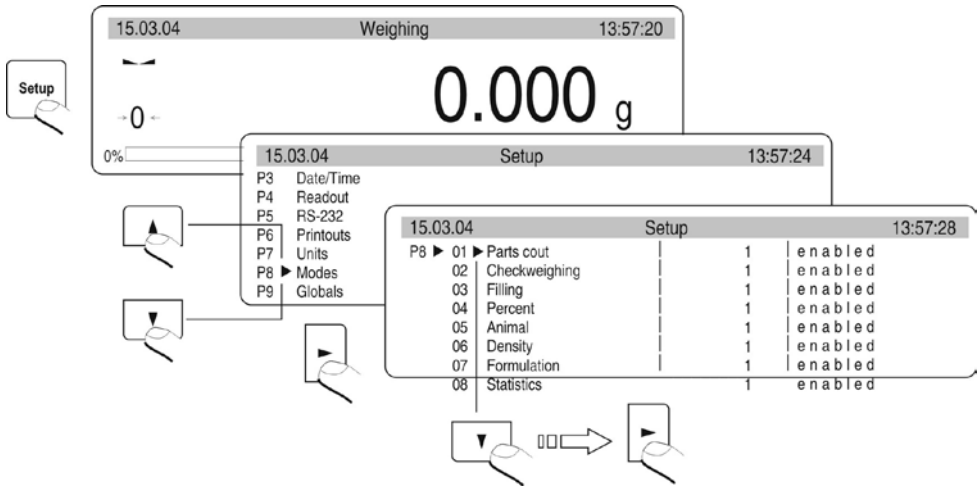
After set proper values of the parameters return to weighing mode in accordance to p 6.1.2 of the manual.

Notice:

For verified balances following units are accessible:[g], [mg], [ct].

## 16. SETTING ACCESSIBILITY OF THE WORK MODES

In this group of parameters user declares work modes which are accessible for operator after pressing **Mode** key



Draw. 27. Functions - setting

All work modes values of the parameters are 1: yes are accessible from the level of switching between work modes. The changes of the parameters can be done according to p. 6.1.1 of the manual

## 17. OTHER PARAMETERS

User can set parameters have influence on work with balance in group of the parameters P9 Others eg. beep signals etc. Enter submenu group P9 Others.

### 01 ID Setting

it includes 6 digits 6 codes which can be used during printouts for product specification, operator, batch etc.

### 02 Aut. Printout ID

for the option YES all digit codes are printed, for option NO the codes are not printed

### 03 Signal

beep signal for pressing keys

#### 04 Language

selection of languages

#### 05 Backlight

switch on/off the backlight

#### 06 Brightness

Changes brightness of screen - after entering this function a window appears, by means of keys on the balance brightness on the display can be changed

#### 07 Contrast

changes contrast – after entering this function a window appears, by means of keys on the balance contrast on the display can be changed

#### 08 Screen server

if the screen server is switched on displayed values disappear after settled time and if displayed value of the measurement does not change.

#### 09 Temperature

it is information about temperature which is registered by temperature sensor in the balance. Return to the menu – press the ESC key

#### 10 The balance number

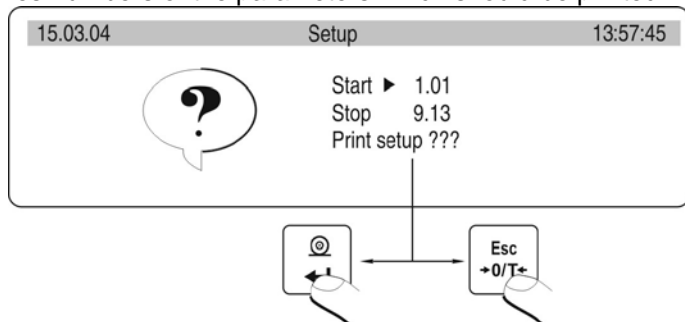
it is only information about factory number of the balance

#### 11 The number of the program

it is information about program number of the balance

#### 12 Printout of the parameters

if the function is active the balance parameters in user menu are printed. User gives numbers of the parameters which should be printed.



Draw. 28. Submenu Others - printing setting

After confirmation parameters are printed through RS 232 port, actually sent settled user parameters in the balance

### 13 The parameter reception

If the functions are activated all parameters of the balance are received through RS 232. After reception the balance informs user how many parameters are accepted, how many are changed, how many were declared incorrectly and how many were not accepted by the software. Printing and reception of the parameters is very easy and fast procedure of introducing new setting.

After printing actual parameters to file in the computer user changes the parameters very quickly and without any problems. User sends new corrected setting to the balance software. After these changes the balance accepts new set up. User must know all parameters and computer operation very well

### 14 Password protection

this submenu contains options about access password for administrator and user (see 7.1.)

## 18. USING WORK MODES

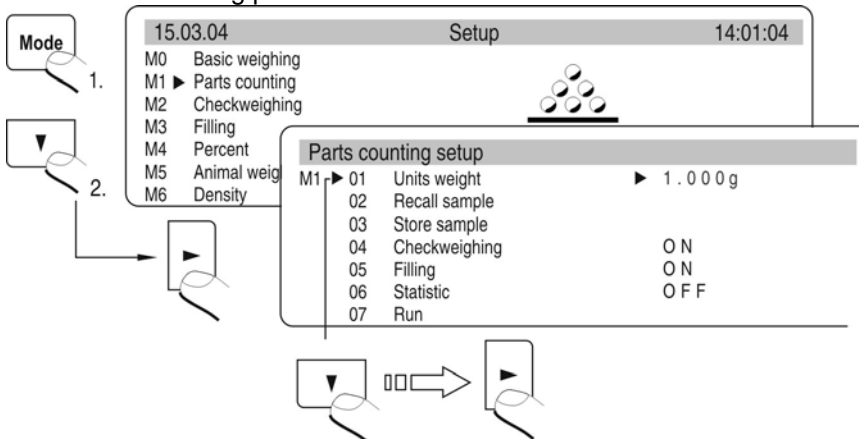
### 18.1. Counting pieces of the same mass

It can be done after write singular piece mass:

- Write singular piece mass
- Determine singular piece mass on base of standard quantity
- Element selection from date base

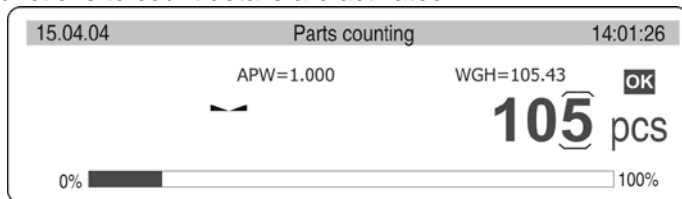
#### 18.1.1. Counting pieces after writing piece mass

Start function of counting pieces.



Draw. 29. Counting pieces – main menu

Set standard mass and press the **ENTER** or select 07 Start and press the **RIGHT ARROW**. Functions to count details are activated.



Draw. 30. Counting pieces – display view

- APW – singular piece mass [g]
- WGH – all pieces mass on the pan
- pcs – mark for counting pieces

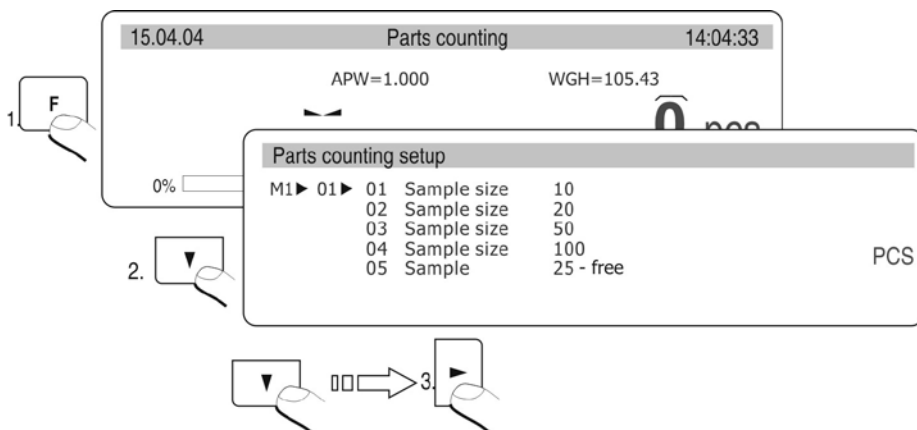
### Return to weighing

- Press the **MODE** and display shows list of all functions
- Select **MO Weighing**,
- Press the **RIGHT ARROW**, display show stage of weighing



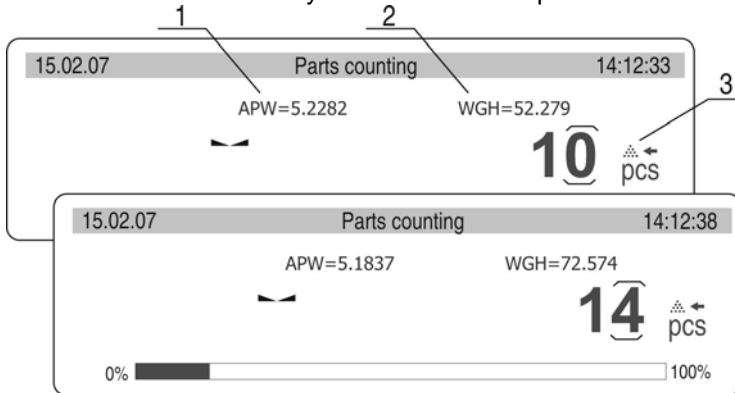
### 18.1.2. Counting through determine singular element mass from the standard batch

Start the procedure of counting pieces, it does not matter which mass in the field 01. Select **07 Start** and press the key **RIGHT ARROW**. In the counting pieces function press the key **F**. Dialog window appears on the display. Select the batch quantity (fields 01 – 04) or write it in 05 – Standard



Draw . 31. Counting pieces with using standard batch

Then press the **RIGHT ARROW** key and follow orders presented on the display.



Draw 32. display with AKD function

- 1- Single piece mass
- 2 - all elements mass
- 3 - AKD (automatic correction of precision function)

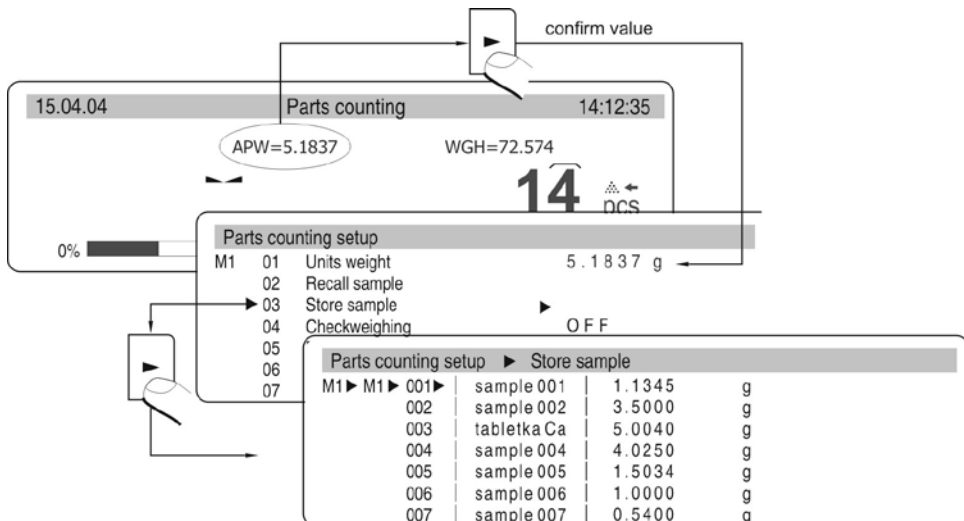
Display shows quantity of pieces which are on the pan (10 pieces). If less than counted actually quantity is added mass of singular piece is corrected. In this case APW = 5.2282 to 5.1837. From this moment following pieces are counted in relation to singular mass.

This way mass of singular piece can be determined on base of batch standard.

### **There are four conditions of AKD (Automatic Correction of Preciseness) in the balance software**

1. quantity of pieces (after adding) must be higher than it was previously
2. quantity of pieces (after adding) must be less than twice quantity which was on the display before adding
3. actual quantity must be in tolerance  $\pm 0,3$  of the total value,
4. the result must be stable.

If user decides that batch quantity is enough singular piece mass must be introduced into the balance memory after pressing the key **RIGHT ARROW**.

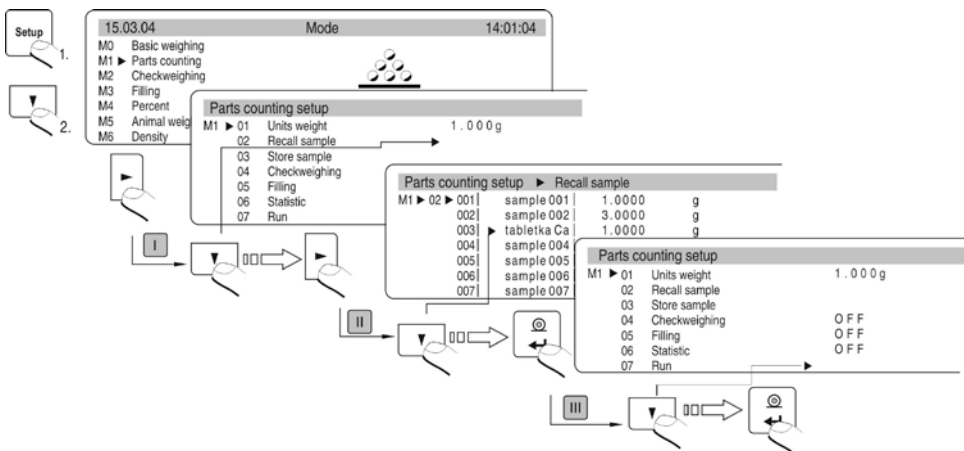


Draw 33. Automatic Correction of Preciseness – record in date base

Select the field and write names of weighed elements. Press the **Enter** (record name) and **Enter** (record value). Next to name singular piece mass should be introduced. It can be remembered using 02 Recall sample

### 18.1.3. Select piece from data base

Active function of counting pieces as it is shown on below scheme



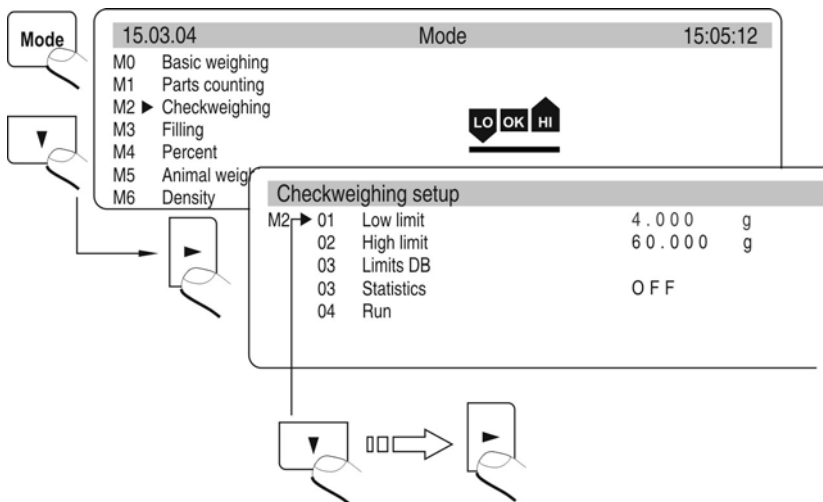
Draw 34. Select piece from date base

Select piece form date base. Start counting pieces.

### 18.2. Checkweighing

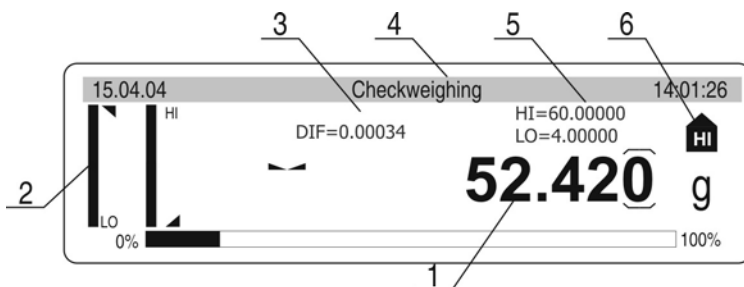
The sample is weighed precisely when the limits of weighing are settled. The process is shown (side graphs) and controlled.

### The function activation:



Draw 35. Checkweighing – the function activation

### Display



Draw 36. Checkweighing – display view

- 1 – result
- 2 – bar graphs
- 3 – function name
- 4 – difference between masses of weighed load and middle of tolerance field (HI/LO)
- 5 – value of low (LO) and (HI) high limit
- 6 – graphs which presents weighing range



Remember to set the parameter 02 High limit firstly. The balance program checks if the values are correct and if they are in measure range.

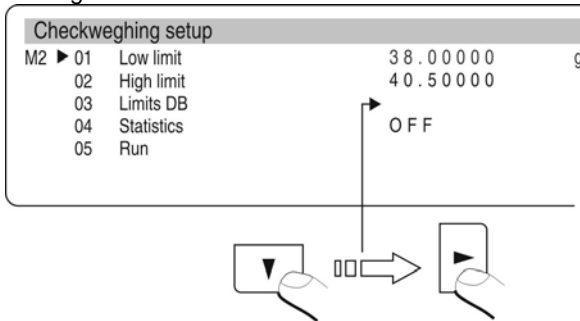
If settled values of the parameters are incorrect the balance shows command about error and returns to setting parameters without changes

### Checkweighing with stages base

Checkweighing can be done with stage base which include:

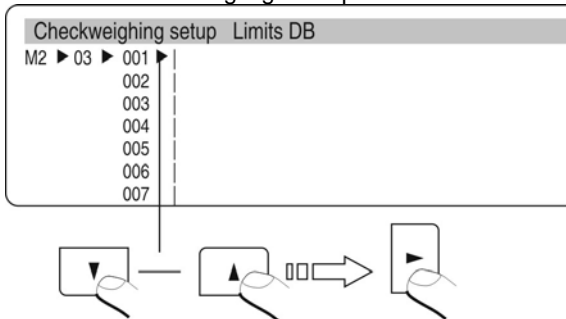
- 500 records
- Name of material for each record (max 10 alphanumerical signs)
- Value of upper stage for each record
- Value of bottom stage of each records

### Stage base programming



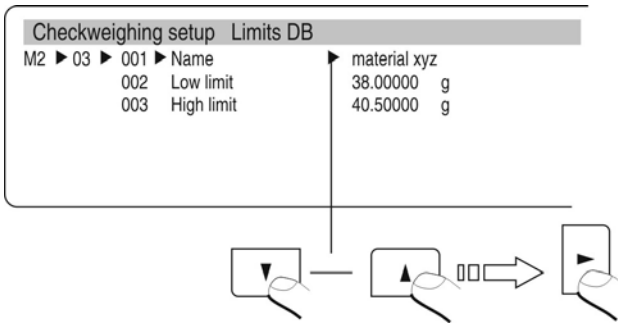
Draw. 37. Checkweighing-submenu view

- Move sign to field „stage base” and press **RIGHT ARROW**
- Select number of record moving sign and press **RIGHT ARROW**



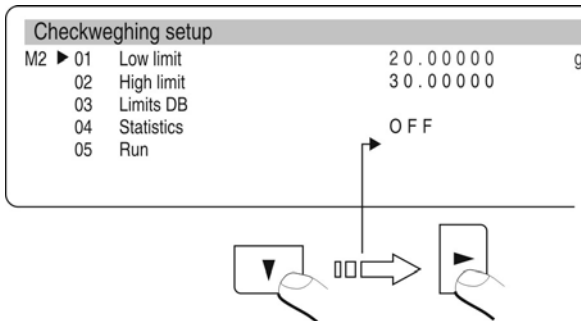
Draw. 38. Checkweighing stages base programming

- Move sign to field „material 02” and press **RIGHT ARROW**



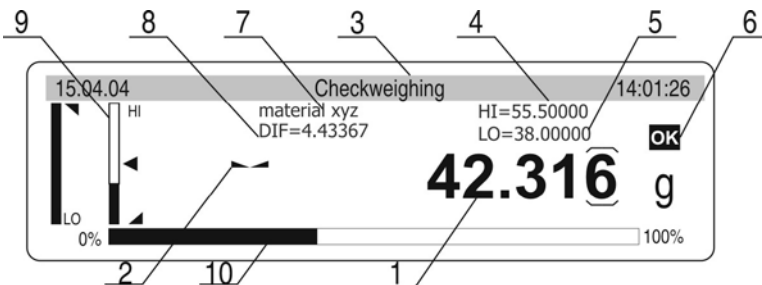
Draw. 39. Checkweighing stage base programming

- Write name for selected record (name of product which is weighed)
- Write value of upper stage
- Write value of down stage
- Confirm by pressing **ENTER** twice



Draw. 40. Checkweighing – start work with stages

- Move sign to „**START**” field and press **RIGHT ARROW**
- Balance is ready to weighing in stages



Draw. 41. Checkweighing – display view

- 1 – result
- 2 – stable measurement
- 3 – function name
- 4 – value of top stage
- 5 – value of bottom stage
- 6 – graphic scheme which defines stage where the load is weighed (LO – OK - HI)
- 7 – name of material recorded in base
- 8 – difference between result and midpoint of stages
- 9 – graphic scheme in which stage range is weighed mass
- 10 – bar graph which shows used range of capacity.

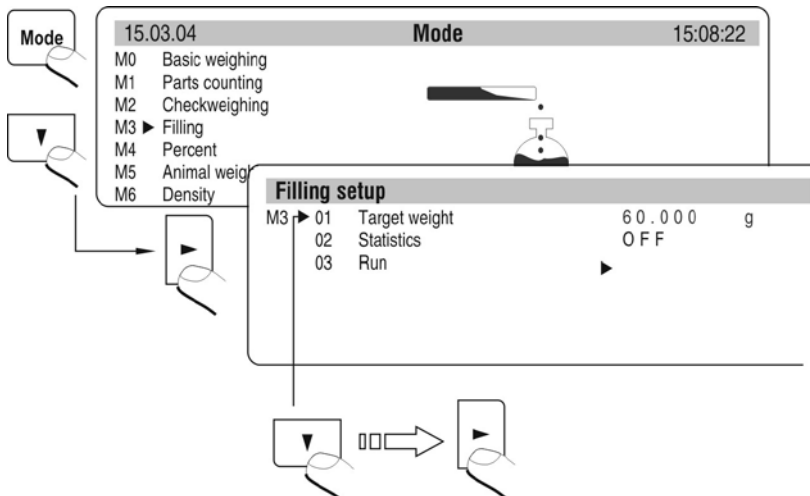
**Selection of different material from stages base**

- During checkweighing press **SETUP**
- Display shows dialogue window, move to stages base and select other material or write other values for top stage and bottom stage (if stages base is not used)

**18.3. Dosage**

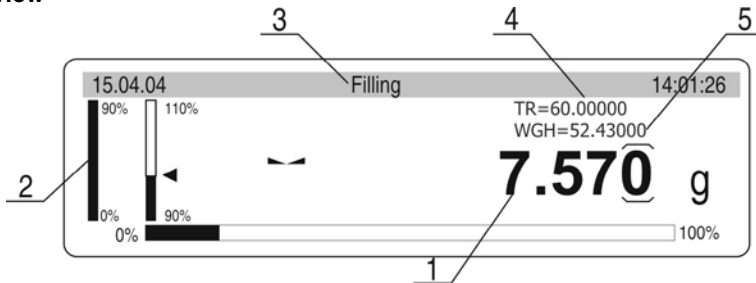
Function of checkweighing (filling) is used to filling load until it reaches assumed value. Before start of process write mass which is checkweighing stage.

**Activation**



*Draw. 42. Checkweighing - activation*

## Display view



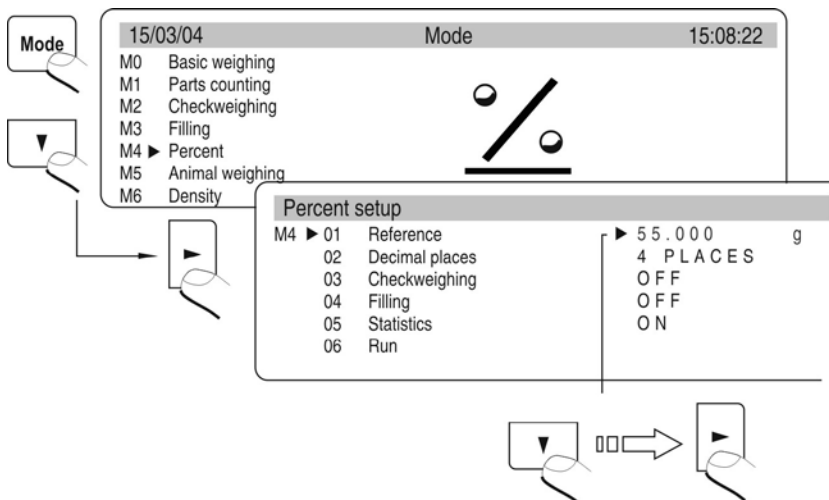
Draw. 43. Checkweighing – display view

- 1 – load to put on to reach assumed mass
- 2 – bar graphs
- 3 – name of function
- 4 – TR value of assumed mass which was declared  
(see above draw M3 01 Assumed mass)
- 5 – WGH mass on the pan

## 18.4. Deviation

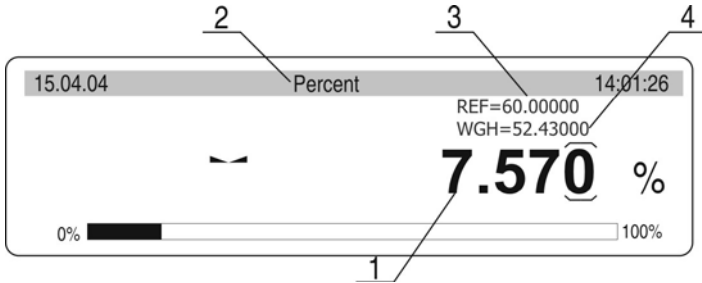
This function is to compare load mass to standard mass which value is written. Displayed result is percentage of value mass on the pan in relation to standard mass. Refer mass can be written in function options or define through weighing standard (description at the end in p. 17.4.of the manual). Together with deviation function additionally two functions can be used: checkweighing, dosage, statistics.

### Activation



Draw. 44. Deviation –activation

**Display view**



Draw. 45. Deviation –display

- 1 – percentage value, relation load on pan to standard mass recorded as relation mass
- 2 – name of function
- 3 – REF reference mass (see draw. 40 – M4 01)
- 4 – WGH mass on pan

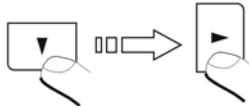
**Cooperation of deviations with other functions**

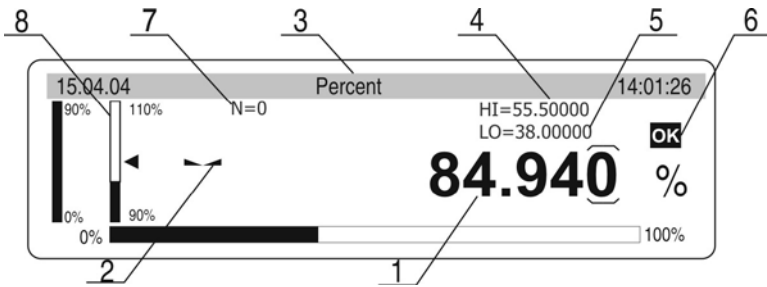
During activation set YES in parameters M4 03, 04, 05. Then move sign to field START and start work.

Note:

- After setting Checkweighing YES write top and bottom stage as values in %.
- After setting Checkweighing YES write values assumed mass in %
- After selection Statistics move sign to field Cancel and cancel previous statistics and then move sign to Statistics and change attribute NO into attribute YES. Confirm with Enter.

Percent setup	
M4 ▶ 01	Reference ▶ 55.00000 g
02	Decimal places 4 PLACES
03	Checkweighing ON
04	Filling ON
05	Statistics ON
06	Run



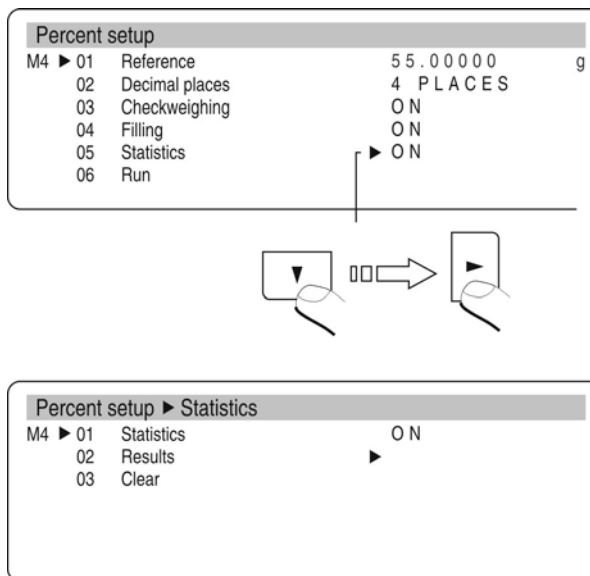


*Draw. 46. Deviations – cooperation with other functions*

- 1 – percentage values, relation of mass on pan to standard mass as refer mass
- 2 – sign of stable measurement
- 3 – name of function
- 4 – REF refer mass
- 5 – WGH mass on pan
- 6 – graphic scheme which determines stage where weighed load is
- 7 – statistics (N=0 – no measurements)
- 8 – active dosage function (load mass between 90 – 110%)

After series measurements eg. 10 (measurements N=10) user can see result of statistics for series of measurements.

- Enter submenu of work mode
- Set sign next to parameter 05 Statistics
- With F key enter parameter 05 Statistics
- Set sign next to parameter 02 Results
- Enter function of showing results of statistics
- With ENTER key user can print results of statistics
- Return to submenu statistics and higher levels – key **ESC**



*Draw. 47.Deviations –cooperation with other functions - Statistics*

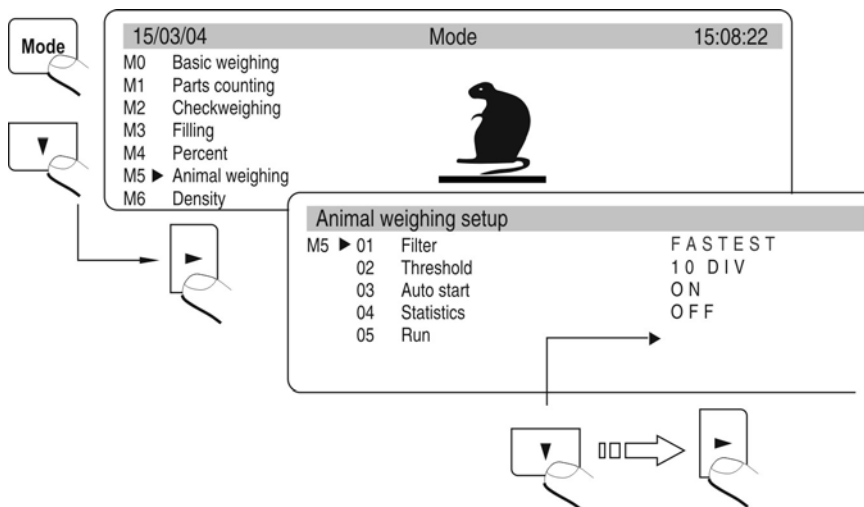
### **Determination of refer mass through weighing standard mass**

In software refer mass can be determined by weighing standard mass. In main window of the function press **F**. Software starts procedure with displaying special order. Follow orders. After procedure software return to main window of deviation function.

## 18.5. Weighing animals

Function which uses various filters to define correct mass of moving animals.

### Function activation



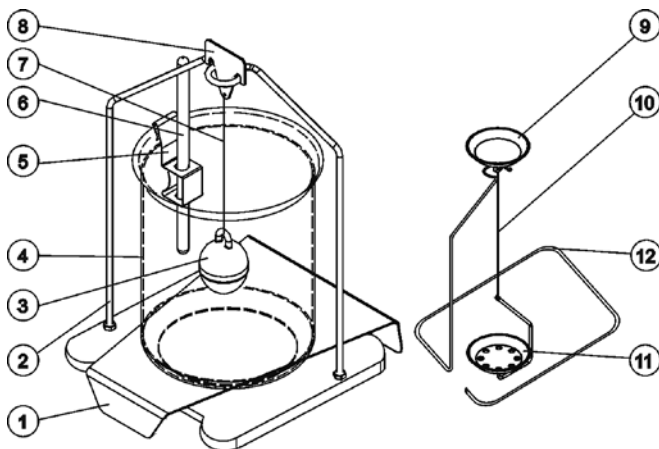
Draw 48. Weighing animals – view of the display

### External setting

- FILTR (Decides how fast final stable result is received, the faster filter the shorter time of measurement)
- STAGE (Value in actual scale intervals is value the result must be below. The result of weighing must be smaller than value of actual scale intervals in order to do following automatic measurement)
- AUTO START (Automatic start up following measurements)
- STATISTICS (Statistics counting for particular subjects)
- START (Start measurements up)

## 18.6. Density of solids and liquids

In additional equipment of analytical balances there are Specific Gravity Measurement Kit



Draw 49. Specific Gravity Measurement Kit

- |                       |                  |
|-----------------------|------------------|
| 1. Baker stand        | 7. String.       |
| 2. Pan stand.         | 8. Float hook.   |
| 3. Float.             | 9. Top pan.      |
| 4. Beaker.            | 10. String.      |
| 5. Thermometer clamp. | 11. Bottom pan.  |
| 6. Thermometer.       | 12. Attachments. |

### 18.6.1. Density of liquids

Basic component during measure solids of liquids is glass float. It has precise determined capacity which is stamped on the float hook. Write password to balance memory before the measurements.

During the measurement of liquid density mass of glass float in the air is compared to its mass in the liquid.

The result is presented on the display automatically after its counting by the balance program. The result can be sent through RS 232 to printer or computer after pressing PRINT key.

### 18.6.2. Density of solids

Density of solids can be determined in one of three following liquids:

- WATER (distilled water),
- ALCOHOL (spirit 100% +/- 0.1% at 20 ° C),
- OTHER (other liquid with known density)

Measurement of density of solids is based on comparison sample mass in air (weighed on top pan) to the same sample mass in the liquid (on bottom pan).

The program counts density of sample and displays it on the display. The result can be sent through RS 232 to printer or computer after setting the key PRINT



Precise description of measurements performance and setting is the manual of Specific Gravity Measurement Kit

### 18.7. Formulation

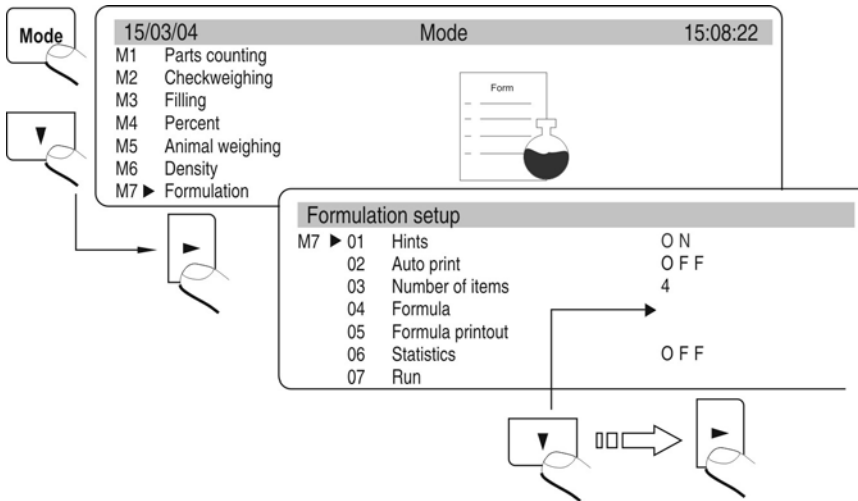
This function is used to make mixtures under recipes. This function is recommended to use in drug-stores. The program is equipped with calculate memory. The balance remembers singular component mass and sum of weighed components.

Following information are presented on the display in this work mode:

1. load mass on the pan
2. actual weighed component name (max 10 signs)
3. mass which should be measured for actual weighed component „WGH”
4. quantity of components which is weighed in the mixture „IC”

## 5. components mass already weighed „SUM”

### The function activation



Draw 50. Recipes – internal setting

#### parameter 01 Hints

after set the parameter at YES the balance displays names and singular components mass recorded in the parameter 04 Recipe on the graphic display

#### parameter 02 Automatic printout

after set the parameter at YES the balance sends value on printer or computer through RS port after confirmation mass of each component

#### parameter 03 Quantity of components

user determines quantity of components the mixture should include (max 20 signs)

#### parameter 04 Recipe

after set this parameter following submenu is displayed. In this submenu user can write names (not more than 10 signs) and set (standard mass) of each component in the mixture

#### parameter 05 Recipe printout

This function prints composition of the mixture on connected printer. There are names and setting of particular component and total contents of the mixture.

parameter 06 Statistics

### parameter 06 01 Statistics

switch on (YES) or switch off (NO) statistic counting

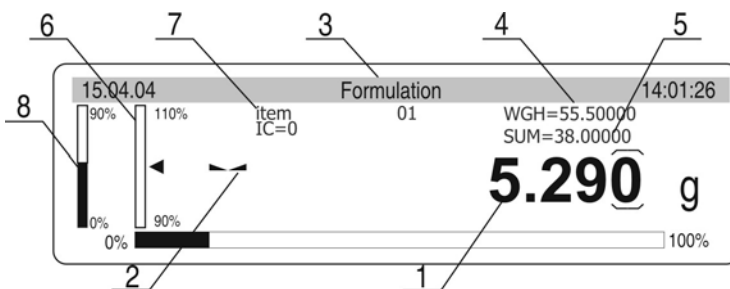
*Attention:*

*Statistics counting refers only to total mass of prepared mixtures (singular components mass are not counted).*

### parameter 07 Start

enter work modes Recipes

### Information on the graphic display for recipes



Draw. 51. Recipes –functions

- 1 – mass which is actually on the pan.
- 2 – stable measurement sing
- 3 – function name
- 4 – settled mass of the weighed component in the parameter  
04 Recipe
- 5 – Sum of weighed components of the mixture which are in calculate  
memory of the balance
- 6 – quantity of weighed components in the recipe
- 7 – name of weighed component
- 8 – side graphs. Information how much left to gain settled component is  
presented on these graphs

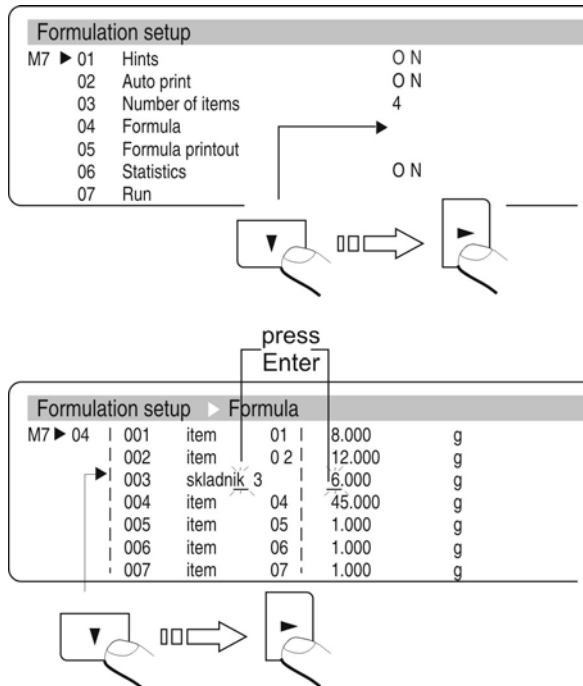


Draw. 52. Bar graphs – automatic scale

**Procedure of preparing mixtures – according to recorded components and their mass in the balance memory**

Write names and components mass in the parameter 04 Recipe. Remember about the dependences:

- there cannot be more than 10 signs
- confirm each name by the **ENTER** key and write mass which will be in the mixture



Draw. 53. Declared recipes

- total mass of the mixture together with the container cannot be bigger than max capacity of the balance
- there cannot be more than 20 components in the mixture
- Write quantity of components in the parameter 03 Quantity of components
- The program records mixture contents in order they were introduced in the parameter 04 Recipes. If user writes 10 components in the parameter 04 Recipes and set 8 for quantity of components the program finishes preparation of the mixture after weighing 8 components
- The balance program creates mixture in order of recorded components in the parameter 04 Recipes and starts from the component 1 and finishes at settled component in the parameter 03 Quantity of components

- If the documentation is printed set the parameter 02 Automatic printout at 1 : YES. After confirmation of each component (key F) their mass are printed on connected printer or computer.
- Set the parameter 01 Prompts at 1 : YES
- Enter function Recipes by pressing the ENTER key
- Tare container mass to the balance memory
- Weight first component (mass in the WGH)
- Press the UNITS key. Mass of component 1 is recorded in the balance memory. The information on the display changes: component 2, mass WGH, IC=1, SUM=. . . .
- Information on the display is settle do zero.
- Repeat it for all components
- After weighing last component and write its mass to the balance memory (the F key) total mass of mixture and prompts to following steps are displayed

### **Procedure of making mixtures without recording components and their mass date in the balance memory**

If documentation of preparing mixture is printed set the parameter 02 Printout at 1 : YES.

Each confirmation of masses of particular components (F key) causes printing their masses together with name on connected printer.

- Set the parameter 01 Prompts at the value 0 : NO
- Enter function Recipes by pressing ENTER
- Tare container mass to the balance memory
- Pour component 1 to the container – in relation to information about mixture
- Press F. Press the UNITS key. Mass of component 1 is recoded in the balance memory. The information on the display changes: IC=1, SUM=. . . . The indication is set to zero.
- Repeat it for all components of the mixture
- After write last component press the  $\rightarrow/T\leftarrow$ . Procedure of making mixtures is finished. Sum of mixture is kept on the display.
- with PRINT key report can be sent or printed.

### **Statistic counting**

Statistics counting relate only to making mixtures (particular mass components are not included in the counting).

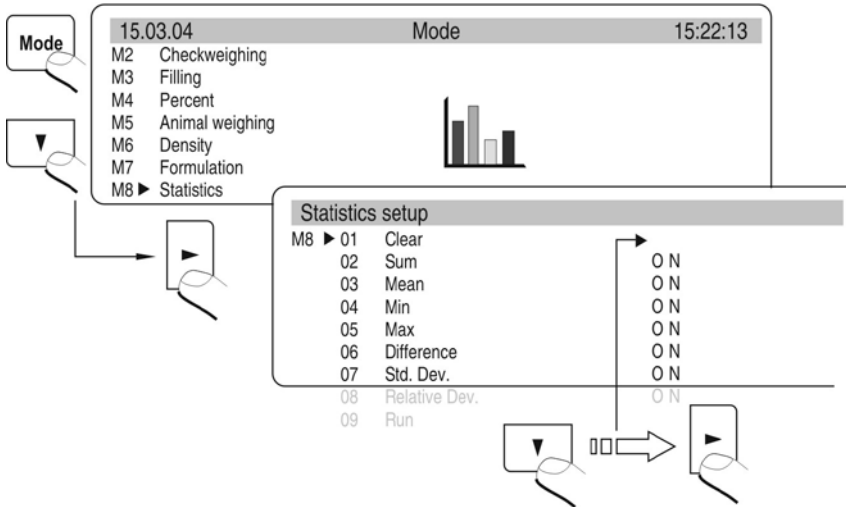
If user performs statistic counting in this work mode:

1. enter the parameter 06 Statistics
2. cancel previous results of statistic counting
3. set the parameter 06 01 Statistics at YES
4. enter work mode for preparing mixtures

5. perform measurement series
6. enter the parameter 06 Statistics again
7. enter the parameter 06 02 Results
8. to print results press the key PRINT

### 18.8. Statistics

#### Activation



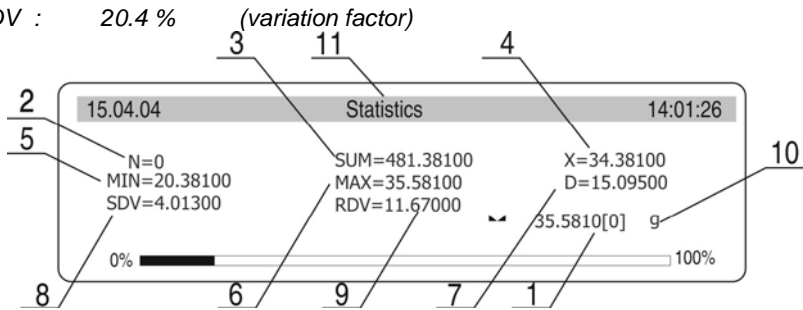
Draw 54. Statistics – function activation

Results of previous statistics should be removed after function activation. It is realized through option **M8 01 Cancel**.

All statistical data are actualized after writing the following measurement to the balance memory. Following measurement is written to series after load is put on the pan, stabilization of the result (measure unit is displayed) and after pressing **ENTER**. User decides what statistical data are presented on the graphic display during measurements by setting their activity in the submenu of work mode (values which are set for YES are active). Independently of the setting (YES/ NO), during the final result the printout contains full statistics.

N	:	5	(quantity of weights)
SUM	:	161.121 g	(all components total mass)
X	:	32.224 g	(average mass of weighed components)
MIN	:	20.486 g	(min mass)
MAX	:	35.578 g	(max mass)
D	:	15.092 g	(difference between Max- Min)
SDV	:	6.581 g	(standard deviation)

RDV : 20.4 %



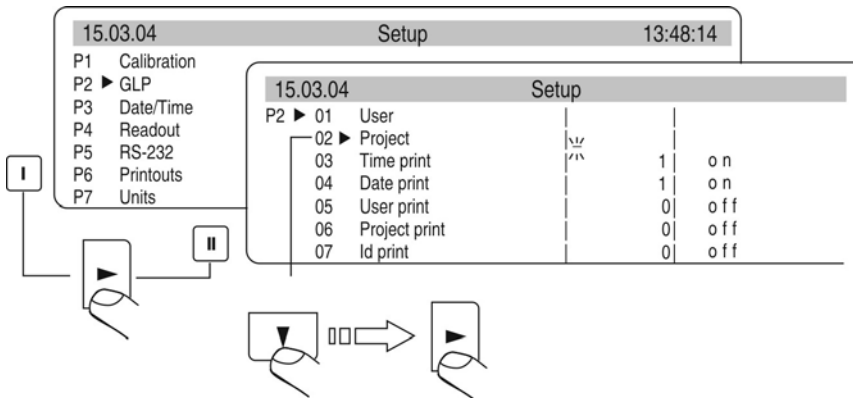
Draw 55. Statistics – display for series of measurement

1. mass on the pan
2. measurement number in measurement series
3. sum of all weighed components in measurement series
4. average mass of weighed components in the series
5. mass of the lightest component in measurement series
6. mass of the heaviest component in measurement series
7. difference between the lightest and the heaviest component in measurement series
8. value of counted standard deviation
9. value of variation factor
10. measure unit [g]
11. work mode

## 19. KINDS OF PRINTOUTS

### 19.1. Standard printout

There are 2 types of printouts. First of them is standard printout. It includes result of weighing and all variables which have attribute YES in GLP submenu. In User and Project fields names should be written



Draw 56. Declaration of variables to printout – submenu GLP

Example of standard printout:

```

Date       : 06/10/2008
Time       : 12:57:35
User Id    : WILK
Project Id : TEST
Balance Id : 235544
Last calibration :
-----
06/10/2008   12:50
Internal calibration
Diff. :      0.00[0] g
-----
0.00[0] g
  
```

Draw 57 Example of standard printout  
(all option settled on YES – printed)

```

Date       : 06/10/2008
User Id    : WILK
Project Id : TEST
Balance Id : 235544

0.00[0] g
  
```

Draw 58 Example of standard printout

Question mark before load mass means that the result is not stable.

## 19.2. Non-standard printout

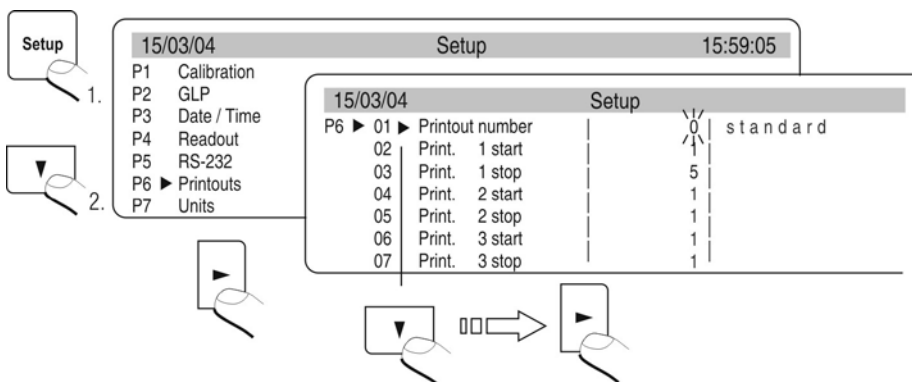
Procedure of creating non-standard printouts:

- user can create own 4 printouts,

- give the number of the text which starts the printout eg. Printout 1 Start – 1 and text number which finishes the printout eg. Printout 1 Stop – 40. In this case texts from 1 to 40 are printed.
- And then write text in the lines 1 ÷ 40.  
It is recommended to use PC keyboard what is easiest and faster way.
- Non-standard printouts can overlap each other:
  - Printout 1 Start – 1
  - Printout 1 Stop – 40
  - Printout 2 Start – 20
  - Printout 2 Stop – 40

**Non-standard printout can be created by Edition of the printout.**

During manual writing give all special signs as CRLF, tabulator etc. If function Printout Edition is used all these values can be selected in form of ready elements. They are transmitted from one side **Line of selection** to the other window **Printout**



Draw 59. Menu printouts – the function activation

**Non-standard printout can include:**

- Variable dependently on work mode and other user necessities (mass, date, Project No)
- Stable texts in user menu
- Non-standard printout can include not more than 640 signs recorded as 80 texts 8 signs each (from the parameter Text 1 to Text 80). User can design 4 non-standard printouts

**19.2.1. Texts**

**Variables in all modes and with the same values**

%%	Printout of „%” singular sign
%N	Actual net mass in basic unit
%d	Actual date

%t	Actual time
%i	The balance number
%R	The program number
%P	The Project number
%U	The user number
%F	Actual function name – work mode
%C	Date and time of last calibration
%K	Kind of last calibration
%l	Deviation of last calibration
%1	Code 1
%2	Code 2
%3	Code 3
%4	Code 4
%5	Code 5
%6	Code 6

### **Variables dependent on used work mode**

Variable	Description	Mode where the variable is active
%W	1 piece mass	COUNTING PIECES
%H	Top stage	WEIGHING
%L	Down Stage	
%Z	Standard mass	DOSAGE
%B	Reference mass	DEVIATIONS
%A	Filter	WEIGHING ANIMALS
%b	Stage	
%i	Liquid	MEASUREMENT OF DENSITY
%p	Procedure	
%c	Temperature	
%a	Density of liquid	
%v	Float capacity	

### **Statistic variables in all modes apart from basic weighing**

%n	Measurement number
%x	Average value
%S	Sum
%m	Min value

%M	Max value
%D	Difference between max and min value
%s	Standard deviation
%r	Variation factor

### Variable in all modes which value depends on the mode

%V - Mass in actual unit. Value connected to work mode eg. counting pieces for mode Counting pieces or deviation from standard mass in % for mode Deviation

### Special signs used to create special printouts

\\	Singular sign „\”
\c	CRLF
\r	CR
\n	LF
\t	Tabulator
\s	Skip to next „string”
\0	End of the printout

Each text (Text 1÷Text 80) can include max 8 signs (letters, digits, special signs, spaces). To write long sentence create it using 8 signs texts. User can use special signs to include variables dependly on own necessities.

#### Example 1:

Max mass cannot be higher than 11.250 g!

To write this sentence use 46 signs grouped in adjacent lines of text. Set up following texts and write 8 signs in each of them until the sentence finishes.

Parameter number	Text							
	1	2	3	4	5	6	7	8
19 Text 10	M	a	s	a		m	a	k
20 Text 11	s	y	m	a	l	n	a	
21 Text 12	n	i	e		m	o	ž	e
22 Text 13	p	r	z	e	k	r	a	c
23 Text 14	z	a	ć		1	1	.	2
24 Text 15	5	5	0		g	!		

**Example 2:**

Zakład Mechaniki Precyzyjnej „RADWAG”

Date:

Time:

Load mass:





\*\*\*\*Signature:.....

\*\*\* &lt;actual work mode&gt; \*\*\*

Set following texts and write 8 signs in each of them until it is finished.

Parameter number	Text							
	1	2	3	4	5	6	7	8
25 Text 16	Z	a	k	ł	a	d		M
26 Text 17	e	c	h	a	n	i	k	i
27 Text 18		P	r	e	c	y	z	y
28 Text 19	j	n	e	j		„	R	A
29 Text 20	D	W	A	G	„	\	c	D
30 Text 21	a	t	a	:	%	d	\	c
31 Text 22	G	o	d	z	i	n	a	:
32 Text 23	%	t	\	r	\	n	M	a
33 Text 24	s	a		ł	a	d	u	n
34 Text 25	k	u	:	%	N	\	c	\
35 Text 26	c	*	*	*	*	*	P	o
36 Text 27	d	p	i	s	:	.	.	.
37 Text 28	.	.	.	.	.	.	.	\
38 Text 29	c	*	*	*	%	F	*	*
39 Text 30	*							

**On balance desk**

	Move up through digits, letters and signs o 1
	Move down through digits, letters and signs o 1
	Determine sign to change and move right (if the key is pressed flashing sign is moved in right direction. If no sign is written this keys makes space in the text)
	Determine sign to change and move left (after this key is pressed flashing sign is cancelled)



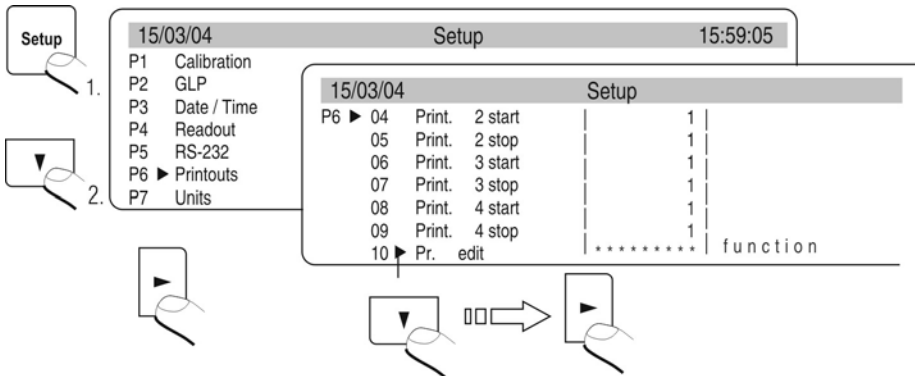
Confirm the text

– **On PS/2 keyboard**

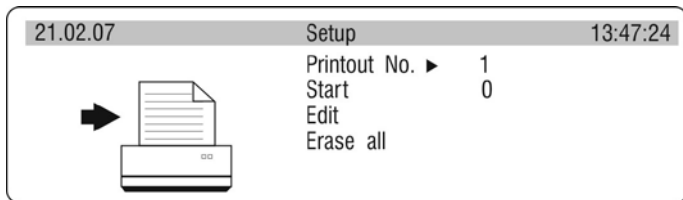
Press F2 to enter main menu. Press F3 to set parameters indications next to group P6 Printouts and press F2 to enter menu group and then select parameter. Press F2 to activate the procedure of writing the text. By means of keyboard write the text (max 8 signs) and confirm by Enter. Repeat this procedure for the rest of the texts

**19.2.2. Composing texts by Edition function**

**Function activation**

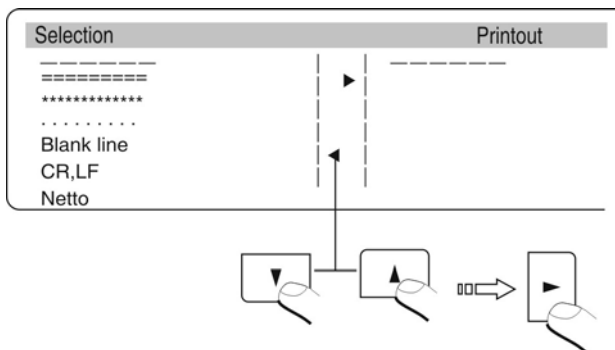


*Draw 60. Not standard printouts – printout edition*



*Draw 60-1. Not standard printouts – printout edition – select*

After activation of the function select printout number (1-4) and beginning of writing text in (range from 1 to 80). Then select option Edition to edit (create) printout and move to edition of printout with RIGHT ARROW.



Draw 61. Edition of printouts – selection of the elements

To select following fields use keys **ARROWS TOP/UP**. To print field press the **RIGHT ARROW** key. After the edition press ENTER/PRINT. Display shows question if printout should be done – press ENTER/PRINT again.

### 19.2.3. Select non-standard printouts

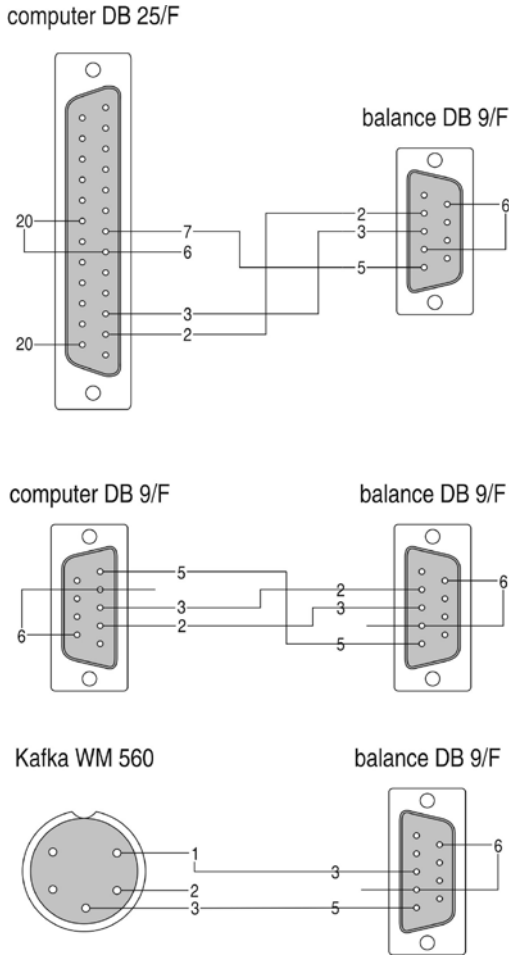
if STANDARD printout is selected – there will be only result and variables declared in the GLP (see p. 18.1)).

If non-standard printout is printed select kind of the printout (1-4) and give the beginning and end of the printout..

## 20. COOPERATION WITH PRINTER OR COMPUTER

Every pressing < **PRINT** > sends signal of actual display state to computer or printer. Speed of balance is 4800 bit/sec. If printer or computer has different speed of transmission change parameter of transmission speed in balance menu.

## 20.1. Schemes of connections



*Draw 62. Connections balance - computer*

The balance connection DB 9/F - computer connection DB 9/F (with control of sending data)

<b><u>Balance</u></b>	<b><u>Computer</u></b>
2 (RxD)	3 (TxD)
3 (TxD)	2 (RxD)
4 (DTR)	6 DSR
5 (GND)	5 (GND)
6 (DSR)	6 (DTR)
7 (RTS)	8 (CTS)
8 (CTS)	7 (RTS)

## 21. COOPERATION WITH PRINTER CITIZEN

You should follow the steps below to assure the proper operation with the label printer. Use the program „ETISOFT” to designer your own label

- label size
- a kind and number of data to place on the label

### **Notice:**

***In order to print properly internal (inside balance) variable, you should predict a proper number of characters for each variable. (charts 2, 3, and 4).***

After giving it an original name, save the label on a computer hard drive. (alphanumeric characters). Download the label to the CITIZEN CLP-521 printer:

- set speed of transmission for RS232 in printer at 9600b/s
- Example of label „Etykieta01”



The diagram shows a rectangular label template with five distinct input fields arranged vertically. The first field contains the text '3xxxxxxx'. The second field contains the text 'Netto mass:'. The third field contains the text '1xxxxxxxxxxxxxxxxxxxxx'. The fourth field contains the text '2xxxxxxxxxxx'. The fifth field contains the text 'Signature: .....'. Each field is enclosed in a thin black border.

*Draw. 63. Example of label*

Design a special printout in the balance that will produce printing the downloaded label. (all the information the printer expects to print it). Set corresponding parameters of printout (example):

- Printout number
- The begin and the end of a printout (start and stop)
- After each measurement there should be 3 labels

### **Printout designing procedure:**

- Inscribe printout data in corresponding texts – P6 parameters’ group Printout; parameters: String 01 ÷ String 80.

Use variables from chart 1 (printout control variables) and variables including different data from the balance.

**TABLE 1**

<b>\02L</b> \c	Start of the label
<b>R</b> <i>labelname</i> \c	Label name
<b>X</b> \c	Start of variable edition
<b>\02U01</b> <i>NN</i> \c	Variable 1; <i>NN</i> – variable symbol
<b>\02U02</b> <i>NN</i> \c	Variable 2; <i>NN</i> – variable symbol
<b>\02U03</b> <i>NN</i> \c	Variable 3; <i>NN</i> – variable
<b>\02Unn</b> <i>NN</i> \c	Variable nn. <i>NN</i> – variable symbol
<b>\02fnnn</b> \c	Paper feeding nnn [mm] – depending on label size
<b>E</b> \c	End of variables edition
<b>\02Ennnn</b> \c	Print nnnn labels
<b>\02G</b> \c	End of label

– An example of internal printout definition

```

15.03.04          Setup          13:48:18
P6 ▶ 10 Pr. edit      * * * * *
11 String 1         \ 0 2 L \ c r E
12 String 2         t y k i e t a 0
13 String 3         | 1 \ c X \ c \ 0
14 String 4         | 2 U 0 1 % N \ c
15 String 5         | \ 0 2 U 0 2 % d
16 String 6         | \ c \ 0 2 U 0 3
17 String 7         | % t \ c \ 0 2 f
18 String 8         | 3 5 0 \ c E \ c
19 String 9         | \ 0 2 E 0 0 0 3
20 String 10        | \ c \ 0 2 G \ c
function
    
```

Draw. 64. Label design in factory menu

- After writing data set rest of the parameters:  
 Number of printout – 1  
 print 1 start – 1  
 print 1 stop – 10

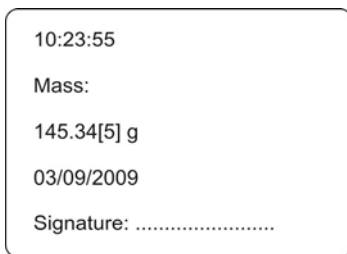
15.03.04		Setup	13:48:18
P6 ▶ 01	Printout No.	0	standard
02	Pr. 1 start	1	
03	Pr. 1 stop	1	
04	Pr. 2 start	1	
05	Pr. 2 stop	1	
06	Pr. 3 start	1	
07	Pr. 3 stop	1	

*Draw. 65. Declaration of printout range*

- After setting all the corresponding parameters, return to weighing mode (save the parameters)..

Now you can connect the balance with the printer (a cable diagram in the users' manual). Check the setting of transmission parameters both in the balance and in the printer. They should be the same. Place a load on the weight pan and after stabilizing press PRINT. The designed printout will be sent to the printer and three identical labels will be printed out.

**Label view**



*Draw. 66. Printed label*

**TABLE2**

Variables present in all operation modes

<b>Variable</b>	<b>Number of characters</b>	<b>Description</b>
%%	1	Single character printout „%”
%N	16 or 18 *	Present net mass in basic unit
%d	10	Present date
%t	8 (for 24 version)	Present time
%i	8	Balance number
%R	8	Program number
%P	8	Project number
%U	8	Operator number
%F	X **	Name of present operation mode
%C	25	Date and time of the last calibration
%K	X **	Type of the last calibration
%l	16 or 18 *	Deviation in the last calibration
%1	6	Code 1
%2	6	Code 2
%3	6	Code 3
%4	6	Code 4
%5	6	Code 5
%6	6	Code 6
%V	16 or 18 *	Mass (present unit) or a value connected with present operation mode eg. Number of pcs for pcs counting or deviation of standard weight in % for deviation mode

\* depends on digit sign and printout parameter to PC/printer

\*\*depends on length of name

**TABLE 3**

Variables that can be used in one operation mode.

<b>Variable</b>	<b>Number of characters</b>	<b>Description</b>	<b>The mode in which the variable is active</b>
%W	16 or 18 *	1 pcs mass	Pcs counting
%H	16 or 18 *	Upper threshold	Dosage
%L	16 or 18 *	Lower threshold	
%Z	16 or 18 *	Expected mass	Dosage
%B	16 or 18 *	Related mass	Deviations
%A	14	Filter	Animals weighing
%b	14	threshold	
%i	14	Liquid	Mass density measurement
%p	14	Procedure	
%c	14	Temperature	
%a	16	Liquid mass density	
%v	16	Plunger volume	

**TABLE 4**

Statistical variables that are present in every operation mode except Basic weighing

<b>Variable</b>	<b>No of characters</b>	<b>Description</b>
%n	7	Measurement number
%x	16	Average value
%S	16	Sum
%m	16	Minimal value
%M	16	Maximal value
%D	16	The difference between minima and maximal value
%s	16	Standard deviation
%r	16	Variance factor

\*depends on the printout parameters PC/printer

\*\* depends on length of name

## 22. COOPERATION WITH PRINTER EPSON

To have polish signs on printouts:

- Introduce formula of changing code side to CP 852 at the beginning of printout

### Scheme of record:

`\1B\74\12c`

- Program further part of printout according to design and below table of polish signs:

	ą	ć	ę	ł	ń	ó	ś	ź	ż
CP 852	\A5	\86	\A9	\88	\E4	\A2	\98	\AB	\BE

	Ą	Ć	Ę	Ł	Ń	Ó	Ś	Ź	Ż
CP 852	\A4	\8F	\A8	\9D	\E3	\E0	\97	\8D	\BD

(write codes instead of polish signs)

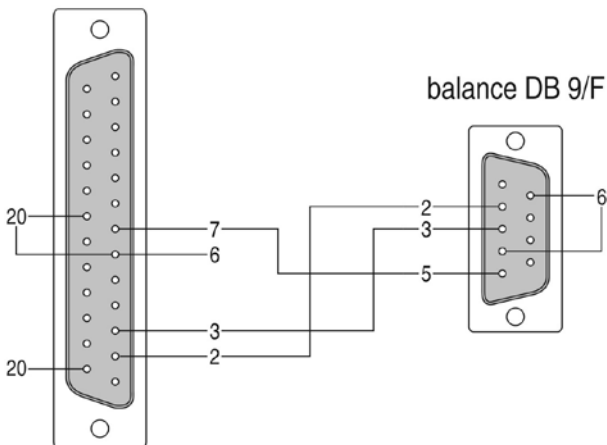
If user wants the paper to be cut off following data must be introduced in:

`\1D\56\41\08\C`

### Scheme of connection

balance – printer Citizen , balance – printer Epson

DB 25/F



Draw. 67. Scheme balance – printer Citizen

### 23. WEIGHING LOADS UNDER THE BALANCE

In standard version balances PS/X have possible to weight loads under the balance. To use this function:

1. Remove the cover in the base of the balance,
2. The suspension eye is directly connected to the weighing mechanism. It is installed permanently by producer.
3. Place hook in the suspension (hook is not standard equipment),
4. hook mass should be tare into balance memory
5. weight load on the hook



1. Take great care not to move or rotate the eye, as this will damage the weighing mechanism.
2. The mass of all suspended accessories should be set to zero by pressing **TARE** before commencing any weighing.

### 24. CONNECTING ADDITIONAL KEYS

It is possible to connect external tare and print buttons by special luster through port RS232.

Printer or computer can be connected to the cluster.  
Connected elements are not standard accessories of the balance.

### 25. LIST OF COMMUNICATIONS COMPUTER - BALANCE

Function	RESET INTERFACE
Command	R CR LF (zero actual orders, restore factory setting)
Function	SEND ALL COMMANDS FROM THE BALANCE
Command	PC CR LF (all recorded information in commands in the balance program are sent from the balance)
Function	SEND THE RESULT IN BASIC UNIT
Command	S CR LF (result is sent from the balance in basic interval after stability)
Function	SEND RESULT IN BASIC UNIT IMMEDIATELY
Command	SI CR LF
Function	SEND THE RESULT IN ACTUAL INTERVAL
Command	SU CR LF (result in actual unit is sent from the balance after stability)
Function	SEND RESULT IN ACTUAL INTERVAL IMMEDIATELY
Command	SUI CR LF

Function Command	ZERO THE BALANCE Z CR LF (set the balance to zero after it reaches stability)
Function Command	ZERO IMMEDIATELY ZI CR LF
Function Command	TARE WHEN STABLE T CR LF
Function Command	TARE THE BALANCE IMMEDIATELY TI CR LF
Function Command	SWITCH CONSTANCE TRANSMISSION OFF IN BASIC INTERVAL C0 CR LF
Function Command	SWITCH CONSTANCE TRANSMISSION IN BASIC INTERVAL C1 CR LF
Function Command	SWITCH CONSTANCE TRANSMISSION OFF IN ACTUAL INTERVAL CU0 CR LF
Function Command	SWITCH CONSTANCE TRANSMISSION ON IN ACTUAL INTERVAL CU1 CR LF
Function Command	NUMBER OF THE BALANCE NB CR LF
Function Command	RANGE OF WEIGHIGN FS CR LF
Function Command	PROGRAM VERSION RV CR LF
Function Command	WRITE OR CHANGE DATE IN THE BALANCE PD CR LF (the balance sends settled date or the date is changed)
Function Command	WRITE NEW OR CHANGE TIME IN THE BALANCE PD CR LF (the balance sends settled time or this time is changed)
Function Command	WRITE ACTUAL WORK MODE PM CR LF
Function Command	SEND SETUP PS CR LF (all balance setup is sent – printout of the parameters)
Function Command	SOUND SIGNAL – „BEEP“ B CR LF (sound beep is switched on)
Function	SEND LAST ERROR CODE

Command	ER CR LF (last order of the error is sent)
Function	DISPLAY STRING
Command	DS CR LF (signs are show on the display)
Function	CANCEL STRING
Command	CS CR LF (cancels string and restores previous state of the display)
Function	DISPLAY HEADLINE
Command	DH CR LF (sinus are displayed in top headline of the display)
Function	CANCEL HEADLINE
Command	CH CR LF (cancels information in the top headline)
Function	DISPLAY HEADLINE
Command	DF CR LF (displays signs in the bottom headline)
Function	CANCEL HEADLINE
Command	CF CR LF (cancels information in bottom headline)
Function	PERFORM INTERNAL CALIBRATION
Command	CL CR LF
Function	BLOCK THE KEYBOARD
Command	KL CR LF
Function	UNBLOCK THE KEYBOARD
Command	KU CR LF
Function	SWITCH „ECHO“ OFF FOR THE KEYBOARD
Command	E0 CR LF (keys codes are switched off)
Function	SWITCH „ECHO“ ON FOR THE KEYBOARD
Command	E1 CR LF
Function	SWITCH THE BALANCE OFF
Command	O0 CR LF (the same as ON/OFF)
Function	SWITCH THE BALANCE ON
Command	O1 CR LF (the same as ON/OFF)
Function	SWITCH AUTOZERO OFF
Command	A0 CR LF
Function	SWITCH AUTOZERO ON
Command	A1 CR LF

If command which is not listed or with error and with CRLF at the end the command is returned in E S CR LF form. Spaces in the forms should be omitted.

## 26. COMMANDS ABOUT ERRORS

Order	Error number	Error description
"control sum error"	<b>1.1</b>	Errors during date transmission
"A/D Error"	<b>1.2</b>	Converter error
"Exceed range"	<b>2.1</b>	Exceed max measure range of the balance
" Exceed range "	<b>2.2</b>	Exceed max measure range of the balance
"A/D Null"	<b>2.3</b>	No divisions from converter
"A/D Full"	<b>2.4</b>	Exceed max value converter intervals
"Tara/Zero above the range"	<b>2.5</b>	Exceed admissible tare or zero value
"Tara above the range "	<b>2.6</b>	Exceed admissible tare value for the balances
"Zero above the range"	<b>2.7</b>	Exceed zero range for the balances
"Result > 4% Max"	<b>2.8</b>	To high start mass (start the balance up with load on the pan)
"Result > 1% Max"	<b>2.9</b>	Difference between determined calibration mass and calibration mass recorded in the balance memory higher than (difference >1%)
"Piece < 1 Div"	<b>2.10</b>	Singular mass value in counting pieces function less than actual scale interval
Piece < 10 Div"	<b>2.11</b>	Mass on the pan during determining mass of singular piece in the function of counting pieces less than 10 actual scale intervals
"Ref < 1000 Div"	<b>2.12</b>	Value of reference mass in the function deviations is less than 1000 actual scale intervals
"above the range"	<b>3.1</b>	The parameter value above the range
"Faulty value"	<b>3.2</b>	Inadmissible value of the parameter
"Blocked - DRH"	<b>3.3</b>	The parameter cannot be changed (Function <b>DRH</b> active in the factory menu)
"Writing error "	<b>4.1</b>	Errors during date transmission to sprinter or computer
" Party error"	<b>4.2</b>	
" Frame error"	<b>4.3</b>	
"stopped transmission CTS"	<b>4.4</b>	
" stopped transmission XOFF"	<b>4.5</b>	
"incorrect date"	<b>5.1</b>	Faulty date
"Exceed time"	<b>6.1</b>	Exceed admissible time during for an operation (eg. zero)

Instruction number:  
LMI-38-02/07/11/ENG

**MANUFACTURER**  
OF ELECTRONIC WEIGHING INSTRUMENTS



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