Operating Instruction

Instruction number LMI-17-02/05/09/ENG-C



Analytical balances **CX series**





MAY 2009

Contents

1.	TECH	NICAL PARAMETERS	5
2.	UNWRAPING THE BALANCE		
	2.1.	The balance CX	5
3.	STAR	Г THE BALANCE UP	.7
	3.1.	Conditions of proper usage	7
	3.2.	Set level up	.8
	3.3.	Warmin up	8
4.	APPR	OPRATION	.8
5.	DESC	RIPTION OF THE BALANCE	.9
	5.1.	GRAPHIC DISPLAY	.9
	5.2.	Keyboard	10
6	USED	MENU	4.4
0.	6 1 Mo		11 17
	6.2	User menu	14
7	WEIGI	ling	18
••	7 1	Pinettes calibration	19
	7.2.	Log-in function	20
8.	BALA		22
	8.1.	Automatic balance calibration	23
	8.2.	Calibration test	25
	8.3.	Manual calibration	25
	8.4.		27
9.	SETTI	NG PRINTOUTS FOR GLP PROCEDURES	28
10	. SETTI	NG TIME AND DATE	28
11	. SETTI	NG THE PARAMETERS	31
	11.1.	Setting filter	32
	11.2.	Value release	32
	11.4	Set autozero working	32
	11.5.	Last digit	32
	11.6.	Negative	33
12	FUNC	TIONS IN USING RS 232 PORT	33
13	. PRINT	OUTS	33
14	ACCE	SS TO MASS UNITS	34
15	. SETTI	NG ACCESSIBILITY OF THE WORK MODES	34
16	OTHE	R PARAMETERS	35
17	USING	WORK MODES	37
	17.1.	Counting pieces of the same mass	37
	17.2.	Checkweighing	41
	17.3.	Dosage	44

17.4.	Percents	
17.5.	Weighing animals	
17.6.	Density of solids and liquids	50
17.7.	Formulation	51
17.8.	Statistics	56
17.9.	Calibration of pipettes	57
18. KIND	S OF PRINTOUTS	60
18.1.	Standard printout	60
18.2.	Non-standard printout	62
19. COOI	PERATION WITH PRINTER OR COMPUTER	67
19.1.	Connections	68
20. COOI	PERATION WITH LABEL PRINTERS CITIZEN CLP-521	69
21. COOI	PERATION WITH PRINTER EPSON	74
22. WEIG	HING LOADS UNDER THE BALANCE	75
23. CONI	NECTING ADDITIONAL KEYS	76
24. LIST	OF COMMUNICATIONS COMPUTER-BALANCE	76
25. COM	MANDS ABOUT ERRORS	79

1. TECHNICAL PARAMETERS

	CX 165	CX 205	CX 265	CX 265N	
Max capacity	100/160 g	200 g	60/220 g	80/220 g	
Min capacity	1 mg	1 mg	1 mg	1 mg	
Readability	0,01/0,1 mg	0,01 mg	0,01/0,1 mg	0,01/0,1 mg	
Tare range	-160 g	-200g	-220 g	-220 g	
Repeatabilty	0,025/0,1 mg	0,03 mg	0,02/0,1 mg	0,025/0,1 mg	
Linearity	±0,05/0,2mg	± 0,1 mg	±0,05/0,2mg	±0,05/0,2mg	
Pan size	Φ 85 mm				
Sensibility	2 ppm/°C in temperature +18 ° ÷ +30 °C				
Temperature	+10 ° ÷ +50 °C				
Power supply	adaptor 230V 50Hz AC / 11V AC				
Calibration	internal (automatic)				
Display	graphic (with backlight)				
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. UNWRAPING THE BALANCE

2.1. The balance CX

Cut safety tape off. Take balance off the box. Take all necessary to correct performance of balance elements off the box. After replace balance in place of use put

scale and rest of elements on. The balance is supplied with 230 V AC / 11V AC supplier.

The balance with Φ 85 mm pan:



The balance with Φ 100 mm pan:

- open side doors of weighing chamber,
- inside the chamber place lower shield of weighing chamber(4),
- put centering ring on the shield (3),
- put the balance pan inside the ring (2),
- put the anti-breeze shield on the centering ring (1),
 - close side doors of weighing chamber,
 - turn on balance supply,
 - pin of power adaptor should be connected to socket in the back of balance casing.

- open side doors of weighing chamber,
- inside the chamber place lower shield of weighing chamber (3),
- inside the chamber place anti-breeze shield (2),
- put the balance pan inside the ring (1),
 - close side doors of weighing chamber,
 - turn on balance supply,
 - pin of power adaptor should be connected to socket in the back of balance casing.

The balance with pipettes calibration set:



- slide chamber side doors off (8)
- inside the chamber put bottom ring (8),
- put glass ring on bottom ring (7),
- replace pan inside glass ring (6),
- put upper ring on glass ring (5),
- put steam protection container on upper ring (4),
- put container to pipettes calibration inside the container (3),
- put glass pad on upper ring (2),
- put glass lid on glass pad (1).

Draw. 1. The components installation for the CX balances

3. START THE BALANCE UP

3.1. Conditions of proper usage

- Set the balance on stable table, far from vibrations
- The balance should be replaced far from draughts and air breeze.
- The balance should be in stable temperature and humidity room
- The balance should be replaced far from sources of
- Temperature in the room $+18^{\circ}C \div +30^{\circ}C$ (AS /X)
- If the static electricity has influence on the balance indications it base should be earthed. Earthing screw is in the rear part of the balance base.
- The balance should be replaced in leveled position
- Before pipettes calibration and after assembling the set start the balance with empty pan on (without container). When zeros come up on the display put the container on the pan and after stabilization press ESC/ZERO TARA.

3.2. Set level up

After replacing the balance in the place of usage the balance should be leveled. The correct leveling is shown on the level indication installed at the rear of the balance. The air bubble should be in the centre position of the indication.



3.3. Warmin up

Before measurements user should wait untill the balance reaches temperature stabilization. It is warming up time.

For analytical balances warming-up time is about 1 hour. This periods refers to the balances which ware in surrounding temperature (work) before start weighing. If the analytical balances are kept in lower temperature(for example in winter time) before weighing the warming-up time is about 8 hours and for precision balances it is about 2 hours.

During warm-up stabilization the indications can change.

4. APPROPRATION

The balances with graphic display are used to do precise measurements in laboratories. It is possible to do the zero function in all measure range.

The balance weights in following units:



Draw. 2. Measure units

Apart from weighing in various units the balances have additional functions as:

- counts pieces
- weights
- dosages
- determines deviations of the standard mass

- weights animals
- detemines liquids and solids density
- making mixtures up to recipes
- statistics of measurements series
- recipes

Measure units and particular functions can be inaccessible for user. It is possible to adapt the balance to individual needs and access functions and units which are necessary at this moment.

It is possible to define accessible or no-accessible in user menu and it is described in further part of the manual.

5. DESCRIPTION OF THE BALANCE

5.1. GRAPHIC DISPLAY



Draw. 3. Display

- 1. load mass and quantity of pieces
- 2. measure unit
- 3. the result is stable
- 4. line of max range of the balance
- 5. work mode
- 6. date
- 7. time
- 8. precise ZERO

5.2. Keyboard

Each key is dual-function key. Particular function can be done through. User also can move in the balance menu.



٥	ON/OFF key, switches the display off, after switching off other subcomponents are supplied and the balance is in stand by mode.
F	Function key F ,fast enter into work mode
Mode	Key MODE – selects the work mode
Units	UNITS key, changes measure units
	PRINT/ENTER key – sends information to external instrument (PRINT) or confirms parameter value or function (ENTER).
Esc +0/T+	Key ESC/ZEROTARA – sets indication to zero
Cal	Calibration
Setup	Menu of balances
	Navigation bar

5.3. Connections



- 1. power adapter socket
- 2. PS keyboard connector
- 3. RS 232 port
- 4. additional display socket

Draw. 4. Sockets of the CX balances

6. 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	Int. calibr	* * * * * * * * function			
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 3 hours			
08	Print report	1 on			
P2 GLF	>				
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	ld print	0 off			
08	Last cal print	0 off			
P3 Date	P3 Dato/Timo				
01	Date format	I 0 I DA/MO/YR			
02	Time format	0 24 h.			
03	Time	* * * * * * * function			
04	Date	* * * * * * * * function			
05	Display time	1 yes			
06	Display date	1 j ves			

P4	Read	dout		
	01	Filter	3	normal
	02	Value relase	1	fast + rel
	03	Disp. Refresh	i 1	0.08s
	04	Autozero	1	on
	05	Last digit	, i 1	l always
	06	Negative	1	l disabled
	00	Negative	'	
P5	RS -	232		
	01	Baud rate	1	4800
	02	Parity	0	none
	03	Data bits	j 2	8 bits
	04	Stop bits	i 1	1 bit
	05	Handsake	i o	none
	06	Auto print	i o	none
	07	Interval	1	*0.1s
	08	Min mass	i 4	10 d
	09	Print on stab	, , i 1	l enabled
	10	Printer type	i n	Enson /Standard
	11	Cut naner		
	11	Cut paper	0	110
P6	Print	tout		
	01	Printout no.	I 0	l standard
	02	Printout, 1 start	i 1	
	03	Printout 1 stop	, I 1	
	04	Printout 2 start	1	
	05	Printout 2 ston	 1	
	10	Pr. edit.	* * * * * * * *	function
	11	Text 1		
	11	Text 2		
	09			
P 7	Unit	S		
	01	Grams	1	enabled
	02	Miligrams	1	enabled
	03	Carats	1	enabled
	04	Pounds	j 1	enabled
	05	Ounces	1 1	enabled
	06	Ounces troy	í 1	enabled
	07	Dwt	i 1	l enabled
	08	Taele Hk.	i 1	enabled
	09	Taele S.	i 1	lenabled
	10	Taele T.	, i	lenabled
		Managara	, i 1 1	
	11	IVIOMMS		LEUADIEU
	11 12	Momms Grains	 1	l enabled
	11 12 13	Grains Newtons	 1 1	enabled enabled
	11 12 13 14	Momms Grains Newtons Ticaal	1 1	enabled enabled enabled
	11 12 13 14	Grains Newtons Ticaal	1 1 1	enabled enabled enabled enabled

P 8	Work	k modes	
	01	Parts count	1 enabled
	02	Checkweighing	1 enabled
	03	Dosages	1 enabled
	04	Deviations	1 enabled
	05	Animals	1 enabled
	06	Density	1 enabled
	07	Recipes	1 enabled
	08	Statistics	1 enabled
P9	Othe	rs	
	01	Setting ID	* * * * * * * * function
	02	Autoprint ID	0 disabled
	03	beep	1 enabled
	04	Language	1 Polish
	05	Backlight	1 enabled
	06	Contrst	* * * * * * * * function
	07	Screensaver	0 disabled
	08	Temperature	* * * * * * * * function
	09	Balance number	114493
	10	Software number	MBa.a 35
	11	Par. printout	* * * * * * * function
	12	Par. receive	* * * * * * * * function
	13	Password protectio	n * * * * * * * function

Parameters in user menu are:

- functional for particular activity eg. the balance calibration
- selectable selects one of few values from the balance memory
- noted changes sets in the balance memory eg. Date, time, user number, texts
- ٠

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

- 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

6.1 Move in user menu

User moves in the menu by

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

6.1.1. The balance keyboard



6.1.2. 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

6.1.3. PS computer keyboard

Each key on the balance keyboard has its equvivalent on the PS keyboard - for functions

	Description	keyboard
F1	Switch on/off the balance display	¢
F2	Move to the balance menu	Setup
F3	Selects work mode	Mode
F4	Selects measure unit	Units
F5	PRINT	L ©
F6	TARE	Esc +0/T+

- for Direktion keys

t	Move up	
-	Move to level up	
→	Sets selected parameter	
ł	Move down	¥

Enter Confirm changes		t ©
Esc	Cancel and leave function without changes	Esc +0/T+

6.1.4. By means of virtual keyboard through RS 232

Most of the functions are done by the balance desk or PS keyboard. They are aslo done by sending orders computer – balance.

This commands enables to move in the balance manu and control the balance work. The list of the commands is at the end of the manual.

6.2. User menu

The menu is presented in p.5. Press the **Setup** key in weighing level. Main menu is presented on the display. Select the submenu which is modificated .

15.03.04	Setup	13:48:14
P1 Calibration P2 GLP		
P3 ► Date/Time		
P4 Readout P5 RS-232		
P6 Printouts		
P7 Units		

Draw. 7. Main menu – submenu selection

If the menu is modificated 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. The balance submenu

7. WEIGHING

Following conditions must be fulfilled to get reliable results:

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



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. 7.1.

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

2

SC	
)/T•	۰
	:sc)/T∙

- 3 If the conditions are unfavourable (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 untill the conditions stabilize and press **Esc** again
- 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 Betwenn following measurements do not unpluged 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.

7.1. Pipettes calibration

In special function or via cooperation with special computer software PIPETTES user can calibrate pipettes (pipettes calibration stand). Function is described in further part of manual.



Independently on pipettes calibration for this function steam protection ring must be installed on (see point Unpacking balance). Container of steam curtain minimizes errors of measurement when liquid evaporates during weighing.

Before pipettes calibration pour water to steam protection ring to 2/3 height of ring. The set is ready to use after about an hour –this time is necessary to get moisture stability. Remember to control distilling water level in container – surface of container should be covered with water all the time. Overflow of water in container can be removed with automatic pump or pipette.

To minimize all humidity measurements inside chamber and influence of blast air during opening side doors the dosing liquid from pipettes must be done through a hole in upper cover of weighing chamber.

7.2. Log-in function

The operator has own access code to internal menu. The password system is defined by administrator. Password can contain max 6 digits.

The balance program enables to declare:

- One administrator who is authorised to use all sets and programme functions, change the passwords own and user
- One user who is authorised to sets and the balance functions determined by administrator

Setting password and access authorization

- After set the password and access parameters (parameter P9 13 Password protection) write the password for administrator
- If the admistrator password is different from "0" the program wants administrator password during enter for the parameter P9 13 Password protection.
- Every enter this parameter the software demands administrator password, after writting correct password it is possible to set the parameter P9 13 Password protection
- If the password is not correct the command about wrong password is show and the balance displays previous window
- Dependly on setting the password is shown as digits or stars (start value each digit = 0)

According to point 6.1.1 of the manual enter the menu P9 Others



Draw. 9. Password-activation the function

15.03.04	Setup		13:49:18
·	Administrator User Start Mode Setup Cal+GLP only Asterisk	► 0 0 N 0 N 0 N 0 N 0 N 0	

Draw. 9-1. 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 NO 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 NO (not protected by password) user can use implemented functions in the balance.

- Set up

If it is set up on NO (not protected by password) user can change setting in the balance

- Only Kal+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 starts

Administrator password

Write the password for administrator (max 6 digits) and user. Each admistrator 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 writen 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 dependly on authorizations for user.



Draw. 10. The keys –introducing the values in the menu

8. BALANCE CALIBRATION

To ensure high precision of weighing corrective factor in relation to standard mass must be noted in the balance memory periodicaly – 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: 0,8° C

Kind of calibration:

- Internal automatic calibration
- * started if temperature changes, started if the time changes
- Internal manual calibration
 - * started by the balance keyboard
- Calibration made with external weight
- with declared mass which cannot be modificated
- * with any mass which should be given before the calibration process(for not legalized balances only)

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



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

8.1. Automatic balance calibration

It is performed when:

- Period of time passes from last calibration
- temperature changes for settled value by manufacturer
 - * for balances CX is 0,8° C,

Following information appears on the display:



Draw. 11. Automatic calibration - display view

Time delay in starting the calibration up enables user to take load off the pan untill the measurements are performed. If the T/O key is pressed the calibration process is stopped.

Set up automatic calibration



Draw. 12. 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 autocalibration (time / temp.)
- 6 declaring autocalibration time
- 7 value of factors for autocalibration
- 8 value of time for autocalibration

If the value for autocalibration factor and time changes descriptions for these lines changes as well (on the drawing field No9. And No 10.)

01 Internal calibration

Start internal calibration process, the process is automaticaly 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 – cancell (see. *Draw 6. Return to weighing p. 6.1.2. Return to weighing*)

8.2. Calibration test

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

Calibration	
Check results: Cal. : 109.59172 Act. : 109.58840 Dif. : 0.00332	

Draw. 13. 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 drawing. 6. Return to weighing p. 6.1.2. Return to weighing)

8.3. Manual calibration

8.3.1. Internal calibration

- 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.

After take load off the calibration process is finished.

If the function DRH is active user cannot stop the internal calibration process.

8.3.2. External calibration

The external calibration should be performed with external mass class:

```
F2 – for balances CX
```

List of weights for separate balances is included in technical specification in the final part of the manual.

- 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.

8.3.3. Calibration performed by user

User calibration should be made with any external weight of class:

- F2 for balances CX
- 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. 14. 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 recomended 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.

8.4. 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.

15.0	3.04	Ļ	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	3 h o u r s
	08 •	Print report	i 1i	on

Draw. 15. Submenu calibration

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



Draw. 16. Submenu GLP - setting

Apart from information settled in menu group the report contains: calibration mass remembered by balance after last calibration (description Old:), calibration mass determined during actual calibration (description: Calibration) and deviation of the calibration (description Deviation:) – difference between these two masses.

*** Interi	nal calibration report ***
Date	: 02/09/2008
Time	: 11:21:39
Calibr.	: Internal
Differen	ce: - 0.0000[6] g
User Id	: Wilk
Project I	d: AKY-54
Name	

Draw. 17. Example of balance calibration report

9. 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 the GLP submenu is presented on drawing 19, page 24. If you use the PS/2 keyboard see what dependences are between the balance keyboard and PS/2 keyboard (p. 5.1.2)

10. SETTING TIME AND DATE

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



Draw. 18. 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. 19. Submenu Date / Time -setting time

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



select / hours / minutes / seconds

Draw. 20. Submenu Date / Time -setting time - steering keys

Confirm settled value (last change digit stops flashing)

Repeat above activities for following values. After setting new values for time press the ENTER key. The balance returns to submenu P3 Date/Time and displayed time changes. After setting time return to weighing mode in accordance to p. 6.1.1 of the manual.

04 Date

Set the parameter 04 Date with the **RIGHT ARROW** key. 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. 21. 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 Draw. 6. - 6.1.2. - Return to weighing)

11. 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. 22. Submenu Readout - internal setting

11.1. Setting filter

Dependly on conditions set the filter. If the conditions are conductive 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). Efficience 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).

11.2. Value release

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

11.3. Set the display refreshing time

This parameter determines period of time which the display refreshes in. 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.

11.4. Set autozero working

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 disturbes 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 and off in the parameter P4 03 in accordance with p. 6.1.1 of the manual.

11.5. Last digit

To ensure comfort of work with the balance user determines (dependly 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

11.6. Negative

This function is designed for changes of displaying.

12. FUNCTIONS IN USING RS 232 PORT

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



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

13. PRINTOUTS

This function is used to make not standard printouts and select type of printout. Precise description for printouts is described in p.17.

14. 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 09 Taele Hk., 10 Taele S., 11 Taele T . there are following dependences:

• If all of them have attribute 1: yes the balance show only first of them 09 Taele Hk

If the measurement is done in units 11 Taele T set the attribute 0 : no for two previous Enter group of the parameters P7 Units according to p. 5.2.7.



Draw. 24. Measure units - setting

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

For verified balances following measure units are available:[g], [mg], [ct] –despite setting 1 – YES in balance menu .

15. 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. 25. The balance 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.

16. 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 the same as in p. 14.

01 Setting ID

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

02 Automatic 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 Contrast

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

07 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.

08 Temperature

it is information about temperature which is registered by temperature sensor in the balance. Return to the menu – press the ESC key **04 Language** wybór języka opisów parametrów polski lub angielski

09 The balance number

It is only information about factory number of the balance

10 Number of the program

It is information about program of the balance

11 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. 26. Submenu Others -printing setting

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

12 The parameters 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 fastly 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.

13 Password protection

this submenu contains options about access password for administrator and user (see 6.1.)

17. USING WORK MODES

17.1. 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

17.1.1. Counting pieces after writing piece mass

Start function of counting pieces (draw. 30).



Draw. 27. 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. 28. 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

17.1.2. Counting through determine singular element mass from the standard batch

Start the procedure of counting pieces in accordance with p. 16.1.1, 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 **Units**. Dialog window appears on the display. Select the batch quantity (fields 01 - 04) or write it in 05 -Standard.



Draw. 29. Counting pieces with using standard batch

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



Draw. 30. Display with AKD function on

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

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.

The 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
- 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 ± 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. 31. Automatic Correction of Preciseness -record in data 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

17.1.3. Select piece from data base

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



Draw. 32. Select piece from data base

Select piece from data base. Start counting pieces.

17.2. Checkweighing

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

The function activation:



Draw. 33. Checkweighing – the function activation

Display



Draw. 34. Checkweighing -display view

- 1 result
- 2 bargraphs
- 3 function name
- 4 difference between mass 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 stage base

Checkweighing in RANGE BASE which contains:

- 500 records
- Name of the product for each record (max 10 alphanumerical signs)
- Value of upper range for each record
- Value of lower range for each record

Programming stage base



Draw. 35. Checkweighing -submenu view

- Move into "Stage base" and press RIGHT ARROW
- Select record number and press RIGHT ARROW



Draw. 36. Checkweighing- programming stage base

Move into "Stage base" and press RIGHT ARROW



Draw. 37. Checkweighing -stage base programming -values

- Enter name for selected record (product name)
- Enter value of upper range
- Enter value of down range
- Confirm values with ENTER press twice



Draw. 38. Checkweighing - start work with checkweighing ranges

- Move into ,,START" and press RIGHT ARROW
- The balance is ready for weighing in selected ranges



Draw. 39. Checkweighing – display view

- 1 result
- 2 stable measurement
- 3 function name
- 4 value of upper range
- 5 value of down range

6 – graphic interpretation which defines range of weighing with measured load (LO – OK.- HI)

7- name of the product recorded in range base

- 8 difference between result and the ranges
- 9 graphic view which place weighed mass is
- 10 used load of the balance.

Selecting other product from stage base

- Press SETUP during checkweighing
- Display shows dialogue windows ,move to range base and select other product or enter other values for up and down range (if you use range base)

17.3. Dosage

During dosage (pouring) load mass is filled up till the settled mass is reached. Before the procedure set the standard mass which is upper stage of the dosage.

Activation of the function



Display



Draw. 41. Dosage - display

- 1 mass which should be added
- 2 graphs
- 3 function name
- 4 TR reference value mass which is declared (see drawing. 38. M3 01 Reference mass)
- 5 WGH mass on the pan

17.4. Percents

This function compares load mass to standard mass which value should be given. The result of this operation is displayed in percentages.

Following functions: dosage, weighing, statistics can cooperate with deviation function.

Activation of the function





Draw 43. Percents -display

- 1 percentage value, proportion of the mass on the pan and standard mass
- 2 function name
- 3 REF reference mass (see drawing 40 M4 01)
- 4 WGH mass on the pan

Cooperation of the deviations with other functions

During activation of the function set option YES for parameters M4 03, 04, 05. Select field START and start work.

- after setting function Dosage YES give up and down stage as % values

- after setting function Dosage YES give the mass value in %

after selecting Statistics select field Cancel and cancel previous statistics and change the attribute NO into attribute YES. Confirm this option and press the key Enter.



Draw. 44. Percents -cooperation with other functions

1 – percentage value relation of the load on the pan to reference mass

- 2 stable measurement sign
- 3 function name
- 4 REF reference mass
- 5 WGH mass on the pan
- 6 graph which presents weighign range where the weighing range is
- 7 statistics (N=0 no measurements)
- 8 active function dosage (load mass between 90 110%)

After measurements eg. 10 (quantity of measurements N=10) user can see results of statistics of made measurements.

- Enter work mode
- Select the parameter 05 Statistics
- Pressing the F key and enter the parameter 05 Statistics
- Select the parameter 02 Results
- Enter function of showing statistics results
- After pressing the ENTER statistics result can be printed
- Return to statistics submenu and higher levels key ESC



Draw. 45. Percents -cooperation with other functions - Statistics

Reference mass

In this software reference mass can be defined by weighing standard Press \mathbf{F} key in main menu window. The software starts procedure and displays special command. Please follow the commands.

When this procedure is finished the software returns to main window of deviation function.

17.5. Weighing animals

Function activation

Mode	15/ M0 M1 M2 M3 M4 M5 ►	03/04 Basic weighing Parts counting Checkweighing Filling Percent • Animal weighing		Mode	15:08:22	
		Density	Animal 1 M5 ► 01 02 03 04 05	weighing setu Filter Threshold Auto start Statistics Run	UP FASTEST 10 DIV ON OFF	

Draw. 46. Weighing animals-view of the display

Internal 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)

17.6. Density of solids and liquids

In additional equipment of analytical balance there are Specific Gravity Measurement Kit.



Draw. 47. Specific Gravity Measurement Kit

Components of the kit:

1	Beaker stand
2	Pan stand
3	Float
4	Beaker
5	Termometer clamp
6	Termometer
7	String
8	Float hook
9	Top pan
10	String
11	Bottom pan
12	Attachments

17.6.1. 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.

17.6.2. Density of solids

Density of solids can be determined in one of 3 different liquids:

- WATER (destiled 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.

17.7. Formulation

This function is used to make mixtures under recipes. This function is recomended to use in drug-stores. The program is equiped 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. 48. 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

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. 49. 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. 50. 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. 51. 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
- Quantity of components cannot be higher than 20 pcs
- 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 UNITS) 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 UNITS 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. If mass of each component is confirmed each mass with their names is printed on connected printer or computer.

- 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 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. Press the key Units
- Repeat it for all components of the mixture
- After write last component press the **−9/T**←. Procedure of making mixtures is finished. Sum of mixture is kept on the display.
- Press PRINT to print(send) report of made mixture

Statistics counting

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

If user performs statictic counting in this work mode:

- 1. enter the parameter 06 Statistics
- 2. cancell 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

17.8. Statistics

Activation



Draw. 52. Statistics -function activation

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

All statistic date are actualized after write 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 statistic date 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). Independly on setting (YES/ NO), during final result the printout contains full statistics.

N :	5	(quantity of weights)
SUM :	161.121 g	(all components total mass)
Х :	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 %	(variation factor)



Draw. 53. 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

17.9. Calibration of pipettes

Function of pipettes calibration refers to pipettes with stable and changeable capacity. During the procedure precision and repeatability errors both are defined. For pipettes with changeable capacity errors are defined for Max, Min and ½ Max.

All pipettes are checked according to precision and repeatability norm PN-EN ISO 8655:2003.

To ensure precise measurements keep following environmental conditions:

- Temperature of environment, tip and liquid should be 20°C 25°C stabilized during weighing in range of ± 0.5.C
- Moisture about 50 75%

Use distillated water only in a calibration process.

Function activation:



Draw. 54. Calibration of pipettes - activation

Before calibration following data must be loaded:

	gang and the second		
-	Pipette		[stable /changeable capacity]
-	capacity Vmax	[ml]	
-	capacity V1/2max		[ml]
-	capacity Vmin	[ml]	
-	Error of capacity Vmax	[%]	
-	Error of capacity V1/2max		[%]
-	Error of capacity Vmin		[%]
-	Temperature of liquid		[oC]

- I emperature of liquid Atmospheric pressure
- [hPa] [%] Moisture _
- Amount of samples _

Display view



Draw. 55. Calibration of pipettes - display

- 1 result
- 2 function is active
- 3 capacity checked
- 4 average capacity
- 5 precision error
- 6 amount of samples (measurements)

Final result of the procedure is error of precision [ES], standard deviation [sr] and repeatability error [CV].

After each check a result is presented on display.



Draw. 56. Calibration of pipettes - summary

A report is printed after pressing PRINT key.

*** Che	ck pipette raport ***
Temp.	: 22.5 °C
Pressu	re: 1013 hPa
Humidi	ty: 50 %
Result	Vmin:
1	100.45 ul
2	100.55 ul
3	100.55 ul
4	100.65 ul
5	100.55 ul
Vmin=	100.00 ul
Va=	100.55 ul
es=	0.55 ul
es=	0.55 %
sr=	0.07 ul
CV=	0.07 %
Desult	Vanau
Result	Vmax:
1	1004.90 ul
2	1004.60 ul
3	1004.00 UI
4	1004.80 01
5	1004.80 ui

	V	
Vmax= Va= es= es= sr= CV=	1000.00 ul 1004.78 ul 4.78 ul 0.48 % 0.11 ul 0.01 %	
Result 1 2 3 4 5	V1/2: 502.65 ul 502.55 ul 502.45 ul 502.45 ul 502.55 ul	
V1/2= Va= es= es= sr= CV=	500.00 ul 502.53 ul 2.53 ul 0.51 % 0.08 ul 0.02 %	
Name		

Draw. 57. Example of a report of in calibration procedure

18. KINDS OF PRINTOUTS

18.1. 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. 58. Declaration of variables to printout -submenu GLP

Example of standard printout



Draw. 59. Example of standard printout (all options settled on YES - printed)

Date	: 06/10/2008
User Id	: WILK
Project Id	: TEST
Balance Id	: 235544
0.00	00[0] g

Draw. 60. Example of standard printout

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

18.2. 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 recomended to use PC keyboard what is simplier 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 writting 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. 61. Menu printouts –the function activation Non-standard printout can include:

- Variable dependly 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

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 name
%F	Actual function name –work mode
%C	Date and time of last calibration
%K	Kind of last calibration
%I	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	Mod where the variable is active			
%W	1 piece mass	COUNTING PIECES			
%Н	Top stage				
%L	Down Stage	WEIGHING			
%Z	Standard mass	DOSAGE			
%В	Reference mass	DEVIATIONS			
%A	Filter				
%b	Stage				
%i	Liquid				
%р	Procedure				
%с	Temperature	MEASUREMENT OF DENSITY			
%a	Density of liquid				
%v	Float capacity				

Statistic variables in all modes apart from basic weighing

%n	The 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 "stringu"
\0	End of the printout

Each text (Text $1 \div 89$ Text 80) can include max 8 signs (letters, digits, special signs, spaces). To write long sentence create it using 8 sings texts. User can use special signs to include variables dependly on own necessities.

Example 1:

Max mass cannot be higher than 11.250 g!

If user write this sentence uses 46 signs grouped in adjacent lines of the text. Set up following texts and write 8 signs in each of them untill the sentence finishes.

Parameter number		Text						
	1	2	3	4	5	6	7	8
19 Text 10	Μ	а	s	а		m	а	k
20 Text 11	S	у	m	а	1	n	а	
21 Text 12	n	i	е		m	0	Ż	е
22 Text 13	р	r	z	е	k	r	а	С
23 Text 14	Z	а	ć		1	1		2
24 Text 15	5	5	0		g	!		

Example 2:

Zakład Mechaniki Precyzyjnej "RADEKW"

Date: Time: Moad mass:

*****Signature:..... ***<actual work mode>***

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

Parameter number	Text							
	1	2	3	4	5	6	7	8
25 Text 16	Z	а	k	ł	а	d		Μ
26 Text 17	е	С	h	а	n	i	k	i
27 Text 18		Р	r	е	С	у	Z	у
28 Text 19	j	n	е	j		"	R	А
29 Text 20	D	Е	К	W	"	١	С	D
30 Text 21	а	t	а	:	%	d	١	С
31 Text 22	G	0	d	Z	i	n	а	:
32 Text 23	%	t	١	r	١	n	Μ	а
33 Text 24	s	а		ł	а	d	u	n
34 Text 25	k	u	:	%	Ν	١	С	1
35 Text 26	С	*	*	*	*	*	Р	0
36 Text 27	d	р	i	S	:			
37 Text 28								١
38 Text 29	С	*	*	*	%	F	*	*
39 Text 30	*							

	Move up through digits, letters and sings o 1
T	Move down through digits, letters and sings 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 lef (after this key is pressed flashing sign is cancelled)
t ⊚	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.

Description of the computer keyboard is in the p. 5.1.3

18.2.2. Composing texts by Edition function

The function activation



Draw. 62. Not standard printouts -printout edition

After activation of the function select printout number (1-4) and beginning of writting the texts in (range from text 1 to text 80). Then select the option Edition to edite (create) printout or cancell all (remove all printouts).



Draw. 63. Edition of printouts - selection 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.

18.2.3. Select non-standard printouts

if STANDARD printout is selected – there will be only result and variables declared in the GLP (see *p.* 17.1 Standard printout - drawing 60. Declaration of the variables to printout – submenu GLP).

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

19. COOPERATION WITH PRINTER OR COMPUTER

To send the information on the display with the unit of measure to the computer or printer, press the < PRINT > key. 9600 bit/s is the default setting for the speed of transmission. If the peripheral unit has a different speed of transmission, you may change the speed of transmission in the balance menu.

19.1. Connections





Draw. 64. Connections balance - computer

The balance connection DB $9/\mathrm{F}$ – The computer connection DB $9/\mathrm{F}$ (with control of sending date)

<u>Balance</u>	<u>Computer</u>
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)

20. COOPERATION WITH LABEL PRINTERS CITIZEN CLP-521

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 interial (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 printe

- Set RS232 baud rate in the printer to 9600 bits per second
- example of label named "Etykieta01"

	~
Зхххххххх	
Masa netto:	
1xxxxxxxxxxxxxxxx	
2xxxxxxxxx	
Podpis:	

Draw 65. Label example

Design special printout which enables labels according to the design. Set the parameters .:

- Printout number
- Place of start and stop of the printout (start and stop)
- After each measurement 3 labels should be printed

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.

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

TABLE 1

- An example of an internal printout definition

06/1	10/08	5	Setup	14:25:26
P6 ►	10	Pr. edit		function
	11	String 1	\02L\crE	
	12	String 2	tykieta0	
	13	String 3	1\cX\c\0	
	14 ►	String 4	2U01%B\c	
15 16	15	String 5	\02U02%d	
	16	String 6	\c\02U03	
	17	String 7	%t\c\02f	
	18	String 8	350\cE\c	
	19	String 9	\02E0003	
	20	String 10	\c\02G\c	

Draw. 66. Design of the label in menu

- Then set the rest of the parameters
 - Printout number 1 Prn. 1 start - 1 Prn. 1 stop - 10

06/10/08		Setup	14:25:26
P6 ► 01 02 03 04 05 ►	Printout No. Pr. 1 start Pr. 1 stop Pr. 2 start Pr. 2 stop		standard
06 07	Pr. 3 start Pr. 3 stop		

Draw. 67. Declaration of range of printout

 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.

The printout apperance

09:14:56
Masa netto:
145.34[5] g
27/10/1005
Podpis:

Draw. 68. Printed label

TABLE 2

Variable	Number of characters	Description
%%	1	Single character printout "%"
%N	16 or 18 *	Present net mass in basic unit
%d	10	Present date
%t	8 (for 24h 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 work mode
%C	25	Date and time of last calibration
%K	X **	Type of last calibration
%I	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

Variables	present in a	all operation	modes

* if the digit and parameter print to PC/printer is set on ** dependly on name lenght
TABLE 3

Variable	Number of characters	Description	The mode in which the variable is active	
%W	16 or 18 *	1 pcs mass	Psc counting	
%Н	16 or 18 *	Upper threshold	Checkweighing	
%L	16 or 18 *	Lower threshold		
%Z	16 or 18 *	Expected mass	Dosage	
%В	16 or 18 *	Related mass	Deviations	
%A	14	Filter	Animala weighing	
%b	14	Threshold	Animais weighing	
%i	14	Liquid	Mass density measurement	
%р	14	Procedure		
%с	14	Temperature		
%a	16	Liquid mass den sity		
%v	16	Plunger volume		

Variables that can be used in operation mode

TABLE 4

Zmienne statystyczne występujące we wszystkich modach oprócz ważenia podstawowego

Zmienna	llość znaków	Opis zmiennej
%n	7	Measurment number
%x	16	Avarage 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 parameter PC/printer (additional digit marker) **depends on the name length

21. COOPERATION WITH PRINTER EPSON

To have Polish signs on the printouts:

- Change code side into CP852 at the beginning of printout
- _

Record scheme:

\1B\74\12\c

Program following part of the printout according to below tables with 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

(instead of polish signs write their code equvivalents)

To have the paper cut after each printout following command should be entered: $\1D\56\41\08\C$

Connection scheme

balance - printer Citizen , balance - printer Epson

computer DB 25/F



Draw. 69. Scheme of connection balance -printer Citizen

22. WEIGHING LOADS UNDER THE BALANCE

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



Draw. 70. Weighing under analytical balances -location

Remove the cover in the base of the balance. There is a hook visible which can be used to suspend a sample.

Hang the load on the look in the hole under the balance (the hook is a part of standard equipment).

Note:

- 1. The suspension eye is directly connected to the weighing mechanism. 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.

23. 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.

- 1. balance
- 2. cable which connects balance with cluster
- 3. cluster
- 4. button TARA
- 5. button PRINT

24. LIST OF COMMUNICATIONS COMPUTER-BALANCE

Function	INTERFACE RESET
Command	R CR LF (zero actual orders, restore factory setting)
Function Command	SEND ALL COMMANDS FROM THE BALANCE PC CR LF (all recorded information in commands in the balance programme 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	ZERO THE BALANCE
Command	Z CR LF (set the balance to zero after it reaches stability
Function	ZERO IMMEDIATELY
Command	ZI CR LF
Function	TARE WHEN STABLE
Command	T CR LF
Function	TARE THE BALANCE IMMEDIATELY
Command	TI CR LF

Function Command	SWITCH CONSTANCE TRANSMISSION IN BASIC INTERVAL C0 CR LF
Function	SWITCH CONSTANCE TRANSMISSION IN BASIC INTERVAL
Command	C1 CR LF
Function Command	SWITCH CONSTANCE TRANSMISSION OFF IN ACTUAL CU0 CR LF
Function	SWITCH CONSTANCE TRANSMISSION ON IN ACTUAL
Command	CU1 CR LF
Function	NUMBER OF THE BALANCE
Command	NB CR LF
Function	RANGE OF WEIGHIGN
Command	FS CR LF
Function	PROGRAM VERSION
Command	RV CR LF
Function	WRITE OR CHANGE DATE IN THE BALANCE
Command	PD CR LF (the balance sends settled date or the date is changed)
Function	WRITE NEW OR CHANGE TIME IN THE BALANCE
Command	PD CR LF (the balance sends settled time or this time is changed)
Function	WRITE ACTUAL WORK MODE
Command	PM CR LF
Function	SEND SETUP
Command	PS CR LF (all balance setup is sent – printout of the parameters)
Function	SOUND SIGNAL – "BEEP"
Command	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 shown on the display)
Function	CANCELL STRING
Command	CS CR LF (cancels string and restores previous state of the display)
Function	DISPLAY HEADLINE
Command	DH CR LF (sings are displayed in top headline of the display)
Function	CANCELL 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	CANCELL 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 omited

25. COMMANDS ABOUT ERRORS

Command	Error	Error description
	number	-
"control sum error"	1.1	Errors during date transmission
"Error A/D"	1.2	Converter error
"Exceed range"	2.1	Exceed max measure range of the balance
"Exceed range"	2.2	Exceed max measure range of the balance
"A/D Null"	2.3	No divisions from converter
"A/D Full"	2.4	Exceed max value converter intervals
"Tara/Zero above the range"	2.5	Exceed admissible tare or zero value
"Tara above the range"	2.6	Exceed admissible tare value for the balances
"Zero above the range"	2.7	Exceed zero range for the balances
"Result > 4% Max"	2.8	To high start mass (start the balance up with load on the pan)
"Result> 1% Max"	2.9	Difference between determined calibration mass and calibration mass recorded in the balance memory higher than (difference >1%)
"Piece < 1 Div"	2.10	Singular mass value in counting pieces function less than actual scale interval
Piece < 10 Div"	2.11	Mass on the pan during determining mas sof singular piece in the function of counting pieces less than 10 actual scale intervals
"Ref < 1000 Div"	2.12	Value of reference mass in the function deviations is less than 1000 actual scales intervals
"Above the range"	3.1	The parameter value above the range
"Faulty value"	3.2	Inadmissible value of parameter
"Blocked - DRH"	3.3	Zmiana parametru niedopuszczalna (aktywna funkcja DRH w menu fabrycznym)
"Writting error"	4.1	
" Parity error"	4.2	
" Frame error"	4.3	Errors during date transmission to sprinter or
"Stopped transmission CTS"	4.4	computer
"Stopped transmission XOFF"	4.5	
"Incorrect date"	5.1	Faulty date
"Exceed time"	6.1	Exceed admissible time during for an operation (eq. zero)

Instruction number: LMI-17-02/05/09/ENG-C

