USER GUIDE

AS 120.X7

Radwag

Distributed by AKRIBIS

Software manual

ITKP-50-06-04-25-EN

CBCP-07

Character-based Communication Protocol:
PUE CY10 indicator
PUE 5 indicator
CY10 scales
5Y scales
R scales

radwag.com
Scan the QR code to view additional scientific material that may be of interest to you.
There you will find more useful information in an accessible format!

Table of contents

1. GENERAL INFORMATION 5
2. LIST OF COMMANDS 5
3. RESPONSE FORMAT 7
4. COMMANDS OVERVIEW 7
4.1. Zero scale 7
4.2. Tare scale 8
4.3. Give Tare Value 8
4.4. Tare/Zero Scale 8
4.5. Set Tare 9
4.6. Zero immediately 9
4.7. Tare immediately 9
4.8. Send Stable Measurement Result in Basic Measuring Unit 9
4.9. Immediately Send Measurement Result in Basic Measuring Unit 10
4.10. Immediately Send Measurement Results From all Platforms in Basic Measuring Unit 10
4.11. Send Stable Measurement Result in Current Measuring Unit 11
4.12. Immediately Send Measurement Result in Current Measuring Unit 12
4.13. Switch on Continuous Transmission in Basic Measuring Unit 12
4.14. Switch off Continuous Transmission in Basic Measuring Unit 13
4.15. Switch on Continuous Transmission in Current Measuring Unit 13
4.16. Switch off Continuous Transmission in Current Measuring Unit 13
4.17. Lock Scale Keypad 13
4.18. Unlock Scale Keypad 14
4.19. Set Min Checkweighing Threshold 14
4.20. Set Max Checkweighing Threshold 14
4.21. Give Value of Min Checkweighing Threshold 14
4.22. Give Value of Max Checkweighing Threshold 15
4.23. Give Serial Number 15
4.24. Simulation of Pressing ENTER/PRINT Key 15
4.25. Change Platform 16
4.26. Set Mass Value of a Single Item 16
4.27. Set Reference Mass Value 16
4.28. Set Target Mass Value 17
4.29. Select Profile 17
4.30. Give Name of Set Profile 17
4.31. Perform Internal Calibration 18
4.32. Lock Automatic Internal Calibration 18
4.33. Unlock Automatic Internal Calibration 18
4.34. Activate Sound Signal 19
4.35. Give Available Working Modes 19
4.36. Set Working Mode 20
4.37. Give Current Working Mode 21
4.38. Give Accessible Units 21
4.39. Set Unit 21
4.40. Give Current Unit 22
4.41. Give Scale Type 22
4.42. Give Max Capacity 22
4.43. Give Program Version 23
4.44. Set AUTOZERO Function 23
4.45. User Logging 23
4.46. User Logout 24
4.47. Set Environment 24
4.48. Give Set Environment 24
4.49. Set Filter 25
4.50. Give Set Filter 25
4.51. Set Result Approval 25
4.52. Give Set Result Approval 26
4.53. Set last digit 26
4.54. Open Automatic Pipette Calibration Chamber Cover 27
4.55. Close Automatic Pipette Calibration Chamber Cover 27
4.56. Open Weighing Chamber Door 27
4.57. Close Weighing Chamber Door 28
4.58. Give Scale Leveling Status 28

4.59. Move AP-12 pipette robot to n position 29
4.60. Move AP-12 pipette robot to next position 29
4.61. Move AP-12 pipette robot to previous position 29
4.62. Give inputs status 30
4.63. Give outputs status 30
4.64. Set outputs status 30
4.65. Send scale parameters 31
4.66. Send All Implemented Commands 31
5. MANUAL PRINTOUT / AUTOMATIC PRINTOUT 32

1. GENERAL INFORMATION

A. A character-based communication protocol is designed for establishing communication between a RADWAG scale and a peripheral device via RS232, Ethernet and wireless connection.
B. The protocol consists of commands sent from a peripheral device to the scale, and responses from the scale to the device.
C. Responses are sent from the scale every time the command is received as a reaction to the specific command.
D. Commands, forming the communication protocol, enable obtaining data on the scale status and influence its operation, e.g. it is possible to obtain weighing results from the scale, monitor the display, etc.

⚠	***To select the communication port, you need to declare it in the submenu: <Devices / Computer / Port>.***

2. LIST OF COMMANDS

Command	Command overview
Z	Zero scale.
T	Tare scale.
TZ [2)]	Tare/Zero scale.
OT	Give tare value.
UT	Set tare.
TI [1)]	Tare immediately.
ZI [1)]	Zero immediately.
S	Send stable measurement result in basic measuring unit.
SI	Immediately send measurement result in basic measuring unit.
SIA [3)]	Immediately send measurement results from all platforms in basic measuring unit.
SU	Send stable measurement result in current measuring unit.
SUI	Immediately send measurement result in current measuring unit.
C1	Switch on continuous transmission in basic measuring unit.
C0	Switch off continuous transmission in basic measuring unit.
CU1	Switch on continuous transmission in current measuring unit.
CU0	Switch off continuous transmission in current measuring unit.
K1	Lock scale keypad.
K0	Unlock scale keypad.
DH	Set min checkweighing threshold.
UH	Set max checkweighing threshold.
ODH	Give value of min checkweighing threshold.

OUH	Give value of max checkweighing threshold.
SS	Simulation of pressing ENTER/PRINT key.
P [3)]	Change platform.
NB	Give scale serial number.
SM	Set mass value of a single item.
RM	Set reference mass value.
TV	Set target mass value.
PROFILE [4)]	Select profile.
PRG [4)]	Give name of set profile.
IC [4)]	Perform internal calibration.
IC1 [4)]	Lock automatic internal calibration of the scale.
IC0 [4)]	Unlock automatic internal calibration of the scale.
BP	Activate sound signal.
OMI	Give available working modes.
OMS	Set working mode.
OMG	Give current working mode.
UI	Give accessible units.
US	Set unit.
UG	Give current unit.
BN	Give scale type.
FS	Give max capacity.
RV	Give program version.
A	Set AUTOZERO function.
LOGIN [1)]	User logging.
LOGOUT [1)]	User logout.
EV	Set environment.
EVG	Give set environment.
FIS	Set filter.
FIG	Give set filter.
ARS	Set result approval.
ARG	Give set result approval.
LDS	Set last digit.
OC [5)]	Open automatic pipette calibration chamber cover.
CC [5)]	Close automatic pipette calibration chamber cover.
OD [5)]	Open weighing chamber door.
CD [5)]	Close weighing chamber door.
LS [5)]	Give scale leveling status.
PRMOVE [5)]	Move AP-12 pipette robot to n position.
PRNEXT [5)]	Move AP-12 pipette robot to next position.
PRPREV [5)]	Move AP-12 pipette robot to previous position.

GIN [6)]	Give inputs status.
GOUT [6)]	Give outputs status.
SOUT [6)]	Set outputs status.
PS [2)]	Send scale parameters.
PC	Send all implemented commands.

1) – N/A to R scales.
2) - Applies only to R scales.
3) - Applies only to the PUE CY10, PUE 5 indicators.
4) - Applies only to 5Y, R scales.
5) - Applies only to 5Y scales.
6) - Applies only to the PUE 5 indicator.

Each command must end with CR LF characters.

3. RESPONSE FORMAT

On receipt of a command, the indicator responds as follows:

XX_A CR LF	command understood and in progress.
XX_D CR LF	command carried out (appears only after the XX_A command).
XX_I CR LF	command understood but not accessible at this moment.
XX _ ^ CR LF	command understood but max threshold is exceeded.
XX _ v CR LF	command understood but min threshold is exceeded.
XX _ OK CR LF	command carried out.
ES_CR LF	command not recognized.
XX _ E CR LF	time limit exceeded while waiting for stable measurement result (time limit is a characteristic scale parameter).

XX - name of a send command.
_ - space.

4. COMMANDS OVERVIEW

4.1. Zero scale

Format: **Z CR LF**

Response options:

Z_A CR LF **Z_D CR LF**	- command understood and in progress. - command carried out.
Z_A CR LF **Z_^ CR LF**	- command understood and in progress. - command understood but zeroing range is exceeded.

Z_A CR LF **Z_E CR LF**	- command understood and in progress. - time limit exceeded while waiting for stable measurement result.
Z_I CR LF	- command understood but not accessible at this moment.

4.2. Tare scale

Format: **T CR LF**

Response options:

T_A CR LF **T_v CR LF**	- command understood and in progress. - command understood but taring range is exceeded.
T_A CR LF **T_E CR LF**	- command understood and in progress. - time limit exceeded while waiting for stable measurement result.
T_I CR LF	- command understood but not accessible at this moment.

4.3. Give Tare Value

Format: **OT CR LF**

Response: **OT_TARA CR LF –** command carried out.

Response format:

1	2	3	4	5-6	7-15	16	17	18	19	20	21
O	T	space	stability marker	space	tare	space	unit			CR	LF

Tare - 9 characters, right justification.
Unit - 3 characters, left justification.

4.4. Tare/Zero Scale

Applies only to R scales.

Format: **TZ CR LF**

Response options:

T_A CR LF **T_D CR LF**	- command understood and in progress. - command carried out.
T_A CR LF **T_E CR LF**	- command understood and in progress. - time limit exceeded while waiting for stable measurement result.
T_I CR LF	- command understood but not accessible at this moment.

Command operated only in non-verified scales.

4.5. Set Tare

Format: **UT_TARE CR LF**, where: _ - space; **TARE** – tare value.

Response options:

UT_OK CR LF	- command carried out.
UT_I CR LF	- command understood but not accessible at this moment.
ES CR LF	- command not recognized (tare format incorrect).

	Use dot in tare format as decimal point.

4.6. Zero immediately

N/A to R scales.

Format: **ZI CR LF**

Response options:

ZI_D CR LF	- Command succeeded.
ZI_v CR LF	- Zeroing range exceeded.
ZI_I CR LF	- Command not accessible at this moment.
ZI_E CR LF	- Zeroing failed.

4.7. Tare immediately

N/A to R scales.

Format: **TI CR LF**

Response options:

TI_D CR LF	- Command succeeded.
TI_v CR LF	- Tarring range exceeded.
TI_I CR LF	- Command not accessible at this moment.
TI_E CR LF	- Tarring failed.

4.8. Send Stable Measurement Result in Basic Measuring Unit

Format: **S CR LF**

Response options:

S_A CR LF **S_E CR LF**	- command understood and in progress. - time limit exceeded while waiting for stable measurement result.
S_I CR LF	- command understood but not accessible at this moment.
S_A CR LF **MASS FRAME**	- command understood and in progress. - response: mass value in basic measuring unit.

Response format:

1	2-3	4	5	6	7-15	16	17	18	19	20	21
S	space	stability marker	space	character	mass	space	unit			CR	LF

Example:

S CR LF – command sent from a computer.
S _ A CR LF - command understood and in progress.
S _ _ _ _ - _ _ _ _ _ _ 8 . 5 _ g _ _ CR LF – command carried out, response: mass value in basic measuring unit.

4.9. Immediately Send Measurement Result in Basic Measuring Unit

Format: **SI CR LF**

Response options:

SI_I CR LF	- command understood but not accessible at this moment.
MASS FRAME	- immediate response: mass value in basic measuring unit.

Response format:

1	2	3	4	5	6	7-15	16	17	18	19	20	21
S	I	space	stability marker	space	character	mass	space	unit			CR	LF

Example:

S I CR LF – command sent from a computer.
S I _ ? _ _ _ _ _ _ _ 1 8 . 5 _ k g _ CR LF - command carried out, immediate response: mass value in basic measuring unit.

4.10. Immediately Send Measurement Results From all Platforms in Basic Measuring Unit

Applies only to the PUE CY10, PUE 5 indicators.

Format: **SIA CR LF**

Response options:

SIA_I CR LF - command understood but not accessible at this moment.

MASS FRAME „P1” ; MASS FRAME „P2” CR LF - immediate response: mass values from both platforms in basic measuring unit.

;	Mass frame separator.
„P1”	Platform 1.
„P2”	Platform 2.

Response format:

1	2	3	4	5	6	7-15	16	17	18	19
P	n	space	stability marker	space	character	mass	space	unit		

n	Weighing platform number.
Mass	9 characters, right justification.
Unit	3 characters, left justification.

<u>Example:</u>

Assumption: the indicator connects to 2 weighing platforms (platform 1, platform 2).

S I A CR LF – command sent from a computer
P 1 _ ? _ _ _ _ _ _ 1 1 8 . 5 _ g _ _ ; P 2 _ _ _ _ _ _ _ _ _ 3 6 . 2 _ k g _ ; P 3 _ I ; P 4 _ I CR LF - command carried out, immediate response: mass values from all platforms in basic measuring unit. Where: **P 3 _ I** – platform 3 not accessible, **P 4 _ I** - platform 4 not accessible.

4.11. Send Stable Measurement Result in Current Measuring Unit

Format: **SU CR LF**

Response options:

SU_A CR LF **SU_E CR LF**	- command understood and in progress. - time limit exceeded while waiting for stable measurement result.
SU_I CR LF	- command understood but not accessible at this moment.
SU_A CR LF **MASS FRAME**	- command understood and in progress. - response: mass value in current measuring unit.

Response format:

1	2	3	4	5	6	7-15	16	17	18	19	20	21
S	U	space	stability marker	space	character	mass	space	unit			CR	LF

Example:

S U CR LF – command sent from a computer.
S U _ A CR LF - command understood and in progress.
S U _ _ _ - _ _ 1 7 2 . 1 3 5 _ N _ _ CR LF - command carried out, response: mass value in current measuring unit.

4.12. Immediately Send Measurement Result in Current Measuring Unit

Format: **SUI CR LF**

Response options:

SUI_I CR LF	- command understood but not accessible at this moment.
MASS FRAME	- immediate response: mass value in current measuring unit.

Response format:

1	2	3	4	5	6	7-15	16	17	18	19	20	21
S	U	I	stability marker	space	character	mass	space	unit			CR	LF

Example:

S U I CR LF – command sent from a computer.
S U I ? _ - _ _ _ 5 8 . 2 3 7 _ k g _ CR LF - command carried out, immediate response: mass value in current measuring unit.

4.13. Switch on Continuous Transmission in Basic Measuring Unit

Format: **C1 CR LF**

Response options:

C1_I CR LF	- command understood but not accessible at this moment.
C1_A CR LF **MASS FRAME**	- command understood and in progress. - response: mass value in basic measuring unit.

Response format:

1	2	3	4	5	6	7-15	16	17	18	19	20	21
S	I	space	stability marker	space	character	mass	space	unit			CR	LF

Enabling continuous transmission in the basic measuring unit automatically turns off continuous transmission in the current measuring unit.

4.14. Switch off Continuous Transmission in Basic Measuring Unit

Format: **C0 CR LF**

Response options

C0_I CR LF	- command understood but not accessible at this moment.
C0_A CR LF	- command understood and carried out.

4.15. Switch on Continuous Transmission in Current Measuring Unit

Format: **CU1 CR LF**

Response options:

CU1_I CR LF	- command understood but not accessible at this moment.
CU1_A CR LF **MASS FRAME**	- command understood and in progress. - response: mass value in current measuring unit.

Response format:

1	2	3	4	5	6	7-15	16	17	18	19	20	21
S	U	I	stability marker	space	character	mass	space	unit			CR	LF

Enabling continuous transmission in the current measuring unit automatically turns off continuous transmission in the basic measuring unit.

4.16. Switch off Continuous Transmission in Current Measuring Unit

Format: **CU0 CR LF**

Response options:

CU0_I CR LF	- command understood but not accessible at this moment.
CU0_A CR LF	- command understood and carried out.

4.17. Lock Scale Keypad

Format: **K1 CR LF**

Response options:

K1_I CR LF	- command understood but not accessible at this moment.
K1_OK CR LF	- command carried out.

	Command is not stored in memory upon scale restart.

4.18. Unlock Scale Keypad

Format: **K0 CR LF**

Response: **K0_OK CR LF** - command carried out.

4.19. Set Min Checkweighing Threshold

Format: **DH_XXXXX CR LF**, where **XXXXX** – mass format.

Response options:

DH_OK CR LF	- command carried out.
DH_I CR LF	- command understood but not accessible at this moment.
ES CR LF	- command not recognized (mass format incorrect).

4.20. Set Max Checkweighing Threshold

Format: **UH_XXXXX CR LF**, where: _ - space; **XXXXX** – mass format.

Response options:

UH_OK CR LF	- command carried out.
UH_I CR LF	- command understood but not accessible at this moment.
ES CR LF	- command not recognized (mass format incorrect).

4.21. Give Value of Min Checkweighing Threshold

Format: **ODH CR LF**

Response options:

ODH_MASS CR LF	- command carried out.
ODH_I CR LF	- command understood but not accessible at this moment.

Response format:

1	2	3	4	5-13	14	15	16	17	18	19	20
O	D	H	space	mass	space	unit			space	CR	LF

Mass - 9 characters, right justification.
Unit - 3 characters, left justification.

4.22. Give Value of Max Checkweighing Threshold

Format: **OUH CR LF**

Response options:

OUH_MASS CR LF	- command carried out.
OUH_I CR LF	- command understood but not accessible at this moment.

Response format:

1	2	3	4	5-13	14	15	16	17	18	19	20
O	U	H	space	mass	space	unit			space	CR	LF

Mass - 9 characters, right justification.
Unit - 3 characters, left justification.

4.23. Give Serial Number

Format: **NB CR LF**

Response options:

NB_A_"serial no." CR LF	- command understood, response: serial number.
NB_I CR LF	- command understood but not accessible at this moment.

serial no. – serial number of the device. Inserted between inverted commas.

Example:

NB CR LF – command sent from a computer.
NB_A_"123456" CR LF – serial number: 123456.

4.24. Simulation of Pressing ENTER/PRINT Key

Format: **SS CR LF**

In order to take a measurement from an external application connected through a protected software or hardware interface and register it in the alibi memory, the external user should use the **SS<CR><LF>** command. Using other commands is not a measurement in the sense of legal metrology and relieves RADWAG of responsibility for the transmitted data due to the impossibility of their subsequent verification.

Sending **SS CR LF** command to the scale results in automatic saving of the weighing result in a database and in activating declared printout.

	All weighing conditions (result control, stable mass readout, etc.) have to be fulfilled while the command is being sent to the scale.

4.25. Change Platform

Applies to the PUE CY10, PUE 5 indicators only.

Format: **P_N CR LF**, where: _ - space; **N** – platform number (1, 2, 3, 4).

Response options:

P_OK CR LF	- command carried out.
P_I CR LF	- command understood but not accessible at this moment.
ES CR LF	- command not recognized (platform number incorrect).

4.26. Set Mass Value of a Single Item

Format: **SM_XXXXX CR LF**, where: _ - space; **XXXXX** – mass format.

Response options:

SM_OK CR LF	- command carried out.
SM_I CR LF	- command understood but not accessible at this moment.
ES CR LF	- command not recognized (mass format incorrect).

	Command carried out in Parts Counting working mode.

4.27. Set Reference Mass Value

Format: **RM_XXXXX CR LF**, where: _ - space; **XXXXX** – mass format.

Response options:

RM_OK CR LF	- command carried out.
RM_I CR LF	- command understood but not accessible at this moment.
ES CR LF	- command not recognized (mass format incorrect).

	Command carried out in Percent Weighing working mode.

4.28. Set Target Mass Value

Format: **TV_XXXXX CR LF**, where: _ - space; **XXXXX** – mass format.

Response options:

TV_OK CR LF	- command carried out.
TV_I CR LF	- command understood but not accessible at this moment.
ES CR LF	- command not recognized (mass format incorrect).

4.29. Select Profile

Applies to the 5Y, R scales only.

Format: **PROFILES_NAME CR LF**, where: _ - space; **NAME** – profile name.

Response options:

PROFILE OK CR LF	- command carried out.
PROFILE E CR LF	- command understood but profile setting impossible (profile name error).
ES CR LF	- command not recognized (format incorrect).

Profile name must be entered as per format, as in scale, i.e. lower-case and upper-case letters, space (e.g. Fast; Fast dosing, User, Precision).

4.30. Give Name of Set Profile

Applies to the 5Y, R scales only.

Format: **PRG CR LF**

Response options:

PRG_A_"x" CR LF	- command carried out, response: name of set profile.
PRG_I CR LF	- command understood but not accessible at this moment.
ES CR LF	- command not recognized (format incorrect).

x – profile name (between inverted commas).

<u>Example:</u>

PRG CR LF – command sent from a computer (give profile name).
PRG _A_"Fast" CR LF - response: profile name - "Fast".

4.31. Perform Internal Calibration

Applies to the 5Y, R scales only.

Format: **IC CR LF**

Response options:

IC_A CR LF **IC_D CR LF**	- command understood and in progress. - command ended.
IC_A CR LF **IC_E CR LF**	- command understood and in progress. - time limit exceeded while waiting for stable measurement result.
IC_I CR LF	- command understood but not accessible at this moment.

4.32. Lock Automatic Internal Calibration

Applies to the 5Y, R scales only.

Format: **IC1 CR LF**

Response options:

IC1_OK CR LF	- command carried out.
IC1_I CR LF	- command understood but not accessible at this moment.
IC1_E CR LF	- operation not possible, e.g. in the case of attested scale.

	For non-attested scales, command locks internal calibration until it is unlocked via IC0 CR LF command or the scale is switched off. Command does not change scale settings on factors determining initiation of calibration.
	For attested scales, operation is not possible.

4.33. Unlock Automatic Internal Calibration

Applies to the 5Y, R scales only.

Format: **IC0 CR LF**

Response options:

IC0_OK CR LF	- command carried out.
IC0_I CR LF	- command understood but not accessible at this moment.

	For attested scales, operation is not possible.

4.34. Activate Sound Signal

Format: **BP_TIME CR LF**, where: _ - space; **TIME** – duration in [ms] of the sound signal. Recommended range <50÷5000>.

Response options:

BP_OK CR LF	- command carried out, BEEP activated.
BP_I CR LF	- command understood but not accessible at this moment.
ES CR LF	- command not recognized (time format incorrect).

Example:

BP_350 CR LF - command sent from a computer (activate BEEP for 350 ms).
BP_OK CR LF - BEEP activated.

	If value greater than the permissible high limit is given, then BEEP sound is operated for the maximum permissible amount of time.
	BEEP sound activated via BP command is inhibited if in the course of its activation, the sound is activated by means of other device: keypad, touch panel, proximity sensors.

4.35. Give Available Working Modes

Format: **OMI CR LF**

Response options:

OMI CR LF **n_ Mode name CR LF** **OK CR LF**	- command carried out, response: accessible working modes.
OMI_I CR LF	- command understood but not accessible at this moment.

Mode name - working mode name, the name takes form displayed on a particular scale screen, it is provided in a currently selected language.
n - parameter, decimal value determining working mode number.

List of working modes:

1	Weighing
2	Parts counting
3	Percent weighing
4	Dosing
5	Formulations
6	Animal weighing
7	Density

8	Solids Density
9	Liquids Density
10	Peak Hold
11	Totalizing
12	Checkweighing
13	Statistics
14	Pipette Calibration
15	Differential Weighing
16	Statistical Quality Control (SQC)
17	Pre-packed Goods Control
18	Mass control (automatic tablet feeder)
19	Drying
20	Mass comparator
21	Vehicle scale

Working mode numbering is identical for each type of scale. The numbers are assigned to working mode names.

Example:

OMI CR LF - command sent from a computer (give accessible working modes).
OMI CR LF – response: accessible working modes.
1_Weighing CR LF
2_Parts Counting CR LF
3_Percent Weighing CR LF
OK CR LF - command carried out.

4.36. Set Working Mode

Format: **OMS_n CR LF**, where: _ - space; **n** - decimal value determining working mode number. To see detailed description, go to **OMI CR LF** command.

Response options:

OMS_OK CR LF	- command carried out.
OMS_I CR LF	- command understood but not accessible at this moment.
OMS_E CR LF	- command not recognized (incorrect value).

Example:

OMS_2 CR LF - command sent from a computer (set „Parts Counting” working mode).
OMS_OK CR LF - „Parts counting” mode has been set.

4.37. Give Current Working Mode

Format: **OMG CR LF**

Response options:

OMG_n_Mode name CR LF	- command carried out, response: current working mode name and number.
OMG_I CR LF	- command understood but not accessible at this moment.

Mode name – working mode name, the name takes form displayed on a particular scale screen, it is provided in a currently selected language.
n - parameter, decimal value determining working mode number. To see detailed description go to **OMI** command.

Example:

OMG CR LF- command sent from a computer (give current working mode).
OMG_2_Parts Counting CR LF - currently set mode: Parts Counting.

4.38. Give Accessible Units

Format: **UI CR LF**

Response options:

UI_"x_1,x_2, … x_n"_OK<CR><LF>	- command carried out, response: accessible units in current working mode.
UI_I <CR><LF>	- command understood but not accessible at this moment.

x - unit symbols, separated by means of commas.

Example:

UI CR LF - command sent from a computer (give accessible units).
UI_"kg,N,lb,u1,u2"_OK CR LF - response: accessible units.

4.39. Set Unit

Format: **US_x CR LF**, where: _ - space; **x** – parameter, unit symbol (g, kg, N, lb, oz, ct, u1, u2, next).

Response options:

US_ x_OK CR LF	- command carried out, response: the set unit.
US_E CR LF	- error in-course of command execution, no parameter or incorrect format.
US_I CR LF	- command understood but not accessible at this moment.

If x=next the command swaps to another available unit on the list (it simulates "UNIT" button pressing).

Example:

US_kg CR LF - command sent from a computer (set „kg”).
US_kg_OK CR LF - „kg” has been set.

4.40. Give Current Unit

Format: **UG CR LF**

Response options:

UG_x_OK<CR><LF>	- command carried out, response: the set unit.
UG_I <CR><LF>	- command understood but not accessible at this moment.

x - parameter, unit symbol.

Example:

UG CR LF - command sent from a computer (give current unit).
UG_kg_OK CR LF – currently set unit: „kg”.

4.41. Give Scale Type

Format: **BN CR LF**

Response options:

BN_A_”x” CR LF	- command understood, response: scale type.
BN_I CR LF	- command understood but not accessible at this moment.

x - scale type (inserted in between inverted commas).

Example:

BN CR LF - command sent from a computer (give scale type).
BN_A_”C32” CR LF – response: „C32” scale type.

4.42. Give Max Capacity

Format: **FS CR LF**

Response options:

FS_A_”x” CR LF	- command understood, response: max capacity.
FS_I CR LF	- command understood but not accessible at this moment.

x – Max capacity value (in between inverted commas).

Example:

FS CR LF - command sent from a computer (give scale maximum capacity).
FS_A_"3.000" CR LF – Response: Max capacity: „3.000".

4.43. Give Program Version

Format: **RV CR LF**

Response options:

RV_A_"x" CR LF	- command understood, response: program version.
RV_I CR LF	- command understood but not accessible at this moment.

x – program version (in between inverted commas).

Example:

RV CR LF - command sent from a computer (give program version).
RV_A_"1.0.0" CR LF – Response: program version: „1.0.0".

4.44. Set AUTOZERO Function

Format: **A_n CR LF**, where: _ - space; **n** - parameter, value determining autozero state (0 – autozero off, 1 – autozero on).

Response options:

A_OK CR LF	- command carried out.
A_I CR LF	- command understood but not accessible at this moment.
A_E CR LF	- error in-course of command execution, no parameter or incorrect format.

Example:

A_1 CR LF - command sent from a computer (activate autozero function).
A_OK CR LF - autozero function is on.

4.45. User Logging

N/A to R scales.

Format: **LOGIN_NAME,PASSWORD CR LF**, where: _ - space;
NAME,PASSWORD in a form provided by the balance – lower-case letters and upper-case letters

Response options:

LOGIN_OK CR LF	- command understood, user is logged in.
LOGIN_E CR LF	- command understood, an error in name or password occurred.
ES CR LF	- command not recognized (error in format).

⚠	***Name and password have to be inserted as they are set in the scale – upper-case and lower-case letters.***

4.46. User Logout

N/A to R scales.

Format: **LOGOUT CR LF**

Response options:

LOGOUT_OK CR LF	- command understood, user is logged out.
ES CR LF	- command not recognized (error in format).

4.47. Set Environment

Format: **EV_n CR LF**, where: _ - space; **n** – parameter, value determining environment setting (0 – unstable environment, 1 - stable environment).

Response options:

EV_OK CR LF	- command carried out.
EV_I CR LF	- command understood but not accessible at this moment.
EV_E CR LF	- error in-course of command execution, no parameter or incorrect format.

Example

EV_1 CR LF - command from a computer (set environment as „Stable”).
EV_OK CR LF - „Stable” environment has been set”.

⚠	***Command sets <Environment> parameter as <Stable> until changing the value into <Unstable> via EV 0 CR LF command.***

4.48. Give Set Environment

Format: **EVG CR LF**

Response options:

EVG_x_OK CR LF	- command carried out, response: set environment.
EV_I CR LF	- command understood but not accessible at this moment.

x - parameter, currently set environment symbol.

Example:

EVG CR LF - command from a computer (give current environment).
EVG_0_OK CR LF – current environment has been set - „unstable”.

4.49. Set Filter

Format: **FIS_n CR LF**, where: _ - space; **n** - parameter, decimal determining filter number (1 – very fast, 2 – fast, 3 – normal, 4 – slow, 5 – very slow).

Response options:

FIS_OK CR LF	- command carried out.
FIS_I CR LF	- command understood but not accessible at this moment.
FIS_E CR LF	- error in-course of command execution, no parameter or incorrect format.

Example:

FIS_3 CR LF - command sent from a computer (set „normal” filter).
FIS_OK CR LF – „normal” filter has been set.

4.50. Give Set Filter

Format: **FIG CR LF**

Response options:

FIG_x_OK CR LF	- command carried out, response: set filter.
FIG_I CR LF	- command understood but not accessible at this moment.

x - parameter, currently set filter symbol.

Example:

FIG CR LF - command from a computer (give set filter).
FIG_3_OK CR LF – currently set filter - „normal”.

4.51. Set Result Approval

Format: **ARS_n CR LF**, where: _ - space; **n** – parameter, decimal determining result approval (1 – fast, 2 – fast + precise, 3 – precise).

Response options:

ARS_OK CR LF	- command carried out.
ARS_I CR LF	- command understood but not accessible at this moment.
ARS_E CR LF	- error in-course of command execution, no parameter or incorrect format.

Example:

ARS_1 CR LF - command sent from a computer (set result approval as „fast”).
ARS_OK CR LF - „fast” result approval has been set.

⚠	***Numeration is strictly assigned to the name of the result approval and constant in all scale types. If in the specific scale type settings are assigned to the working mode, command changes settings for the active working mode.***

4.52. Give Set Result Approval

Format: **ARG CR LF**

Response options:

ARG_x_OK CR LF	- command carried out, response: result approval setting.
ARG_I CR LF	- command understood but not accessible at this moment.

x - parameter, currently selected result approval symbol.

Example:

ARG CR LF - command sent from a computer (give current result approval).
ARG_1_OK CR LF – currently set result approval - „fast”.

4.53. Set last digit

Format: **LDS_n CR LF**, where: _ - space; **n** – parameter, decimal determining setting for the last digit (1 – always, 2 – never, 3 – when stable).

Response options:

LDS_OK CR LF	- command carried out.
LDS_I CR LF	- command understood but not accessible at this moment.
LDS_E CR LF	- error in-course of command execution, no parameter or incorrect format.

Example:

ARS_1 CR LF - command sent from a computer (set „fast” result approval).
ARS_OK CR LF - „fast” result approval has been set.

⚠	***Numeration is strictly assigned to the name of the result approval and constant in all scale types. If in the specific scale type settings are assigned to the working mode, command changes settings for the active working mode.***

4.54. Open Automatic Pipette Calibration Chamber Cover

Applies to 5Y scales only.

Format: **OC CR LF**

Response options:

OC_OK CR LF	- command carried out.
OC_I CR LF	- command understood but not accessible at this moment.
OC_E CR LF	- error in-course of command execution, no parameter or incorrect format.

4.55. Close Automatic Pipette Calibration Chamber Cover

Applies to 5Y scales only.

Format: **CC CR LF**

Response options:

CC_OK CR LF	- command carried out.
CC_I CR LF	- command understood but not accessible at this moment.
CC_E CR LF	- error in-course of command execution, no parameter or incorrect format.

4.56. Open Weighing Chamber Door

Applies to 5Y scales only.

Format: **OD_n CR LF**, where: _ - space; **n *** - parameter, value determining which door is to be open (1 – right door, 2 – left door).

***)** – parameter important to microscales with rotating doors, for XA scales – parameter value does not matter.

Response options:

OD_A CR LF **OD_D CR LF**	- command understood and in progress. - command ended.
OD_A CR LF **OD_E CR LF**	- command understood and in progress. - time limit exceed while executing command.
OD_I CR LF	- command understood but not accessible at this moment.

	If parameter 1 or 2 value is not given, right door in microscales will open.

Example:

OD_2 CR LF – command sent from a computer (open „left" door).
OD_A CR LF – command understood, door opening initiated.
OD_D CR LF – door is open.

4.57. Close Weighing Chamber Door

Applies to 5Y scales only.

Format: **CD CR LF**

Response options:

CD_A CR LF **CD_D CR LF**	- command understood and in progress. - command ended.
CD_A CR LF **CD_E CR LF**	- command understood and in progress. - time limit exceeded while executing command.
CD_I CR LF	- command understood but not accessible at this moment.

Example:

CD CR LF - command sent from a computer (close door).
CD_A CR LF - command understood, door closing initiated.
CD_D CR LF – door is closed.

4.58. Give Scale Leveling Status

Applies to 5Y scales only.

Format: **LS CR LF**

Response options:

LS_n CR LF	- command carried out, response: scale leveling status.
LS_I CR LF	- command understood but not accessible at this moment.

n - parameter, decimal specifying leveling status (0 – non-leveled scale, 1 – leveled scale).

Example:

LS_1 CR LF- command sent from a computer (give current leveling status).
ARS_OK CR LF – scale is leveled.

4.59. Move AP-12 pipette robot to n position

Applies to 5Y scales only.

Format: **PRMOVE_n CR LF**, where: **n** – position from 0 to 12 (0 meaning base position).

Response options:

PRMOVE_I CR LF	- Command not accessible at this moment.
PRMOVE_E CR LF	- Command has incorrect format (e.g. position out of range).
PRMOVE_A CR LF **PRMOVE_D CR LF**	- Command understood and in progress. - Command succeeded.
PRMOVE_A CR LF **PRMOVE_E CR LF**	- Command understood and in progress. - Communication error.
PRMOVE_A CR LF **PRMOVE_I CR LF**	- Command understood and in progress. - Robot internal error.

Example:

PRMOVE_4 CR LF – command sent from a computer (go to position 4).
PRMOVE_A CR LF – command understood, movement started.
PRMOVE_D CR LF – command succeeded, robot reached position 4.

4.60. Move AP-12 pipette robot to next position

Applies to 5Y scales only.

Format: **PRNEXT CR LF**

Response options:

PRNEXT_I CR LF	- Command not accessible at this moment.
PRNEXT_E CR LF	- Robot is already on the last position.
PRNEXT_A CR LF **PRNEXT_D CR LF**	- Command understood and in progress. - Command succeeded.
PRNEXT_A CR LF **PRNEXT_E CR LF**	- Command understood and in progress. - Communication error.
PRNEXT_A CR LF **PRNEXT_I CR LF**	- Command understood and in progress. - Robot internal error.

4.61. Move AP-12 pipette robot to previous position

Applies to 5Y scales only.

Format: **PRPREV CR LF**

Response options:

PRPREV_I CR LF	- Command not accessible at this moment.
PRPREV_E CR LF	- Robot is already on the base position.
PRPREV_A CR LF **PRPREV_D CR LF**	- Command understood and in progress. - Command succeeded.
PRPREV_A CR LF **PRPREV_E CR LF**	- Command understood and in progress. - Communication error.
PRPREV_A CR LF **PRPREV_I CR LF**	- Command understood and in progress. - Robot internal error.

4.62. Give inputs status

Applies only to the PUE 5 indicator.

Format: **GIN CR LF**

Response options:

GIN_"x" CR LF	- command understood, response: inputs status.
GIN_I CR LF	- command understood but not accessible at this moment.

x - inputs status.

Example:

GIN CR LF – command sent from a computer (give inputs status).
GIN 1111 CR LF – response (inputs status "1111").

4.63. Give outputs status

Applies only to the PUE 5 indicator.

Format: **GOUT CR LF**

Response options:

GOUT_"x" CR LF	- command understood, response: outputs status.
GOUT_I CR LF	- command understood but not accessible at this moment.

x - outputs status.

Example:

GOUT CR LF – command sent from a computer (give outputs status).
GOUT 1111 CR LF – response (outputs status"1111").

4.64. Set outputs status

Applies only to the PUE 5 indicator.

Format: **SOUT_x_y CR LF**, where: **x** - AND type output mask ("1" is to be changed, "0" is to be unchanged); **y** – status outputs.

Response options:

SOUT_OK CR LF	- command carried out.
SOUT_I CR LF	- command understood but not accessible at this moment.

Example:

SOUT_1100_0101 CR LF – command sent from a computer (set the first output to zero and the second to one).
SOUT_OK CR LF – response (command carried out).

4.65. Send scale parameters

Applies to R scales only.

Format: **PS CR LF**

Response options:

PS_A CR LF **…** **PS_D CR LF**	- command understood and in progress. - scale parameters. - command carried out.
PS_I CR LF	- command understood but not accessible at this moment.

4.66. Send All Implemented Commands

Format: **PC CR LF**

Example of a response from a 5Y series scale:

PC A "A,ARG,ARS,BN,BP,C0,C1,CC,CD,CH,CU0,CU1,DH,EV,EVG,FIG,FIS, FS,GIN,GOUT,IC,IPG,K0,K1,LDS,LOGIN,LOGOUT,LS,LWI,NB,OC,OD,ODH, OMG,OMI,OMS,OT,OUH,P,PC,PRG,PRMOVE,PRNEXT,PROFILE,PRPREV, PS,RM,RV,S,SI,SIA,SM,SN,SOUT,SS,SU,SUI,T,TI,TV,TZ,UG,UH,UI,US,UT, WILST,WP,Z,ZI" - command carried out, device has sent all implemented commands.

5. MANUAL PRINTOUT / AUTOMATIC PRINTOUT

It is possible to generate printouts either manually or automatically.

- Manual printout is generated after placing the load on the weighing platform and pressing ↵ key once the weighing result has stabilized.
- Automatic printout is generated automatically after placing the load on the weighing platform and after the weighing result has stabilized.

Printout format:

1	2	3	4 -12	13	14	15	16	17	18
stability marker	space	character	mass	space	unit			CR	LF

Stability marker	[space] if stable [?] if unstable [^] if high limit is out of range [v] if low limit is out of range
Character	[space] for positive values [-] for negative values
Mass	9 characters with decimal point, right justification
Unit	3 characters, left justification

<u>Example:</u>

_ _ _ _ _ _ **1 8 3 2 . 0** _ **g** _ _ **CR LF** - a printout generated from a scale on pressing ↵ key.