USER GUIDE

PUE HX7

Radwag

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Software manual

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CBCP-02

Character-based Communication Protocol
PUE C32 Terminal
PUE HX7 Terminal
PUE HX5.EX Terminal
C32 Multifunctional scale
HX7 Multifunctional scale
HX5.EX Scale for hazardous areas

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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 weighing device and responses from the weighing device.
C. Responses are sent from the weighing device each time a command is received.
D. Commands, forming the communication protocol, enable obtaining data on weighing device status and facilitate influencing weighing device operation, e.g.: acquiring measurement results from the weighing device, monitoring the display, etc.

You can select the communication port in: <Peripherals / Computer / Port> submenu.

2. LIST OF COMMANDS

Command	Command overview
Z	Zero scale.
T	Tare scale.
OT	Give tare value.
UT	Set tare.
S	Send stable measurement result in basic measuring unit.
SI	Immediately send measurement result in basic measuring unit.
SIA *	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.
D1	Set fast dosing threshold.
D2	Set dosing threshold.
OD1	Give value of fast dosing threshold.
OD2	Give value of dosing threshold.
SS	Simulation of pressing ENTER/PRINT key.
P *	Change platform.
NB	Give scale serial number.
SM	Set mass value of a single item.
RM	Set reference mass value.
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	User logging.
LOGOUT	User logout.
PC	Send all implemented commands.

***) -** Applies to the HX7 dual platform scale exclusively.

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 recognised.
XX _ E CR LF	time limit exceeded while waiting for stable measurement result (time limit is a characteristic scale parameter).

XX - name of a sent 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_D CR LF**	- command understood and in progress. - command carried out.
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_TARE 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. 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 recognised (tare format incorrect).

Use dot in tare format as decimal point.

4.5. 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.

4.6. 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.

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

Applies to the HX7 dual platform scale exclusively.

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.

Example:

Assumption: the indicator connects with 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 _ CR LF - command carried out, immediate response: mass values from both platforms in basic measuring unit.

4.8. 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.

4.9. 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.

4.10. 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

4.11. 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.

4.12. 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

4.13. 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.

4.14. 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 weighing device restart.

4.15. Unlock Scale Keypad

Format: **K0 CR LF**

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

4.16. Set Min Checkweighing Threshold

Format: **DH_XXXXX CR LF**, where: _ - space, **XXXXX** - mass format.

Response options:

DH_OK CR LF	- command carried out.
ES CR LF	- command not recognised (mass format incorrect).

4.17. Set Max Checkweighing Threshold

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

Response options:

UH_OK CR LF	- command carried out.
ES CR LF	- command not recognised (mass format incorrect).

4.18. Give Value of Min Checkweighing Threshold

Format: **ODH CR LF**

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

Response format:

1	2	3	4-12	13	14	15	16	17	18	19
D	H	space	mass	space	unit			space	CR	LF

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

4.19. Give Value of Max Checkweighing Threshold

Format: **OUH CR LF**

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

Response format:

1	2	3	4-12	13	14	15	16	17	18	19
U	H	space	mass	space	unit			space	CR	LF

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

4.20. Set fast dosing threshold

It applies to 'Dosing' working mode only.

Format: **D1_XXXXX CR LF,** where: _ - space; **XXXXX** - mass format.

Response options:

D1_OK CR LF	- command carried out.
D1_I CR LF	- command understood but not accessible at this moment.
ES CR LF	- command not understood (wrong mass format or threshold value).

	The requisite for setting the fast dosing threshold value is the selected dosing procedure that includes 'Dose automatically' step.
	The declared fast dosing threshold value must be: ***- lower than Max scale,*** ***- lower than the dosing threshold value.***

4.21. Set dosing threshold

It applies to 'Dosing' working mode only.

Format: **D2_XXXXX CR LF,** where: _ - space; **XXXXX** - mass format.

Response options:

D2_OK CR LF	- command carried out.
D2_I CR LF	- command understood but not accessible at this moment.
ES CR LF	- command not understood (wrong mass format or threshold value).

	The requisite for setting the dosing threshold value is the selected dosing procedure that includes 'Dose automatically' step.
	The declared dosing threshold value must be: ***- lower than Max balance,*** ***- higher than zero,*** ***- higher than fast dosing threshold value.***

4.22. Give value of fast dosing threshold

It applies to 'Dosing' working mode only.

Format: **OD1 CR LF**

Response options:

OD1_MASA CR LF	- command carried out.
OD1_I CR LF	- command understood but not accessible at this moment.

Response format:

1	2	3	4-12	13	14	15	16	17	18	19
D	1	space	mass	space	unit			space	CR	LF

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

	The requisite for reading the fast dosing threshold value is the selected dosing procedure that includes 'Dose automatically' step.

4.23. Give value of dosing threshold

It applies to 'Dosing' working mode only.

Format: **OD2 CR LF**

Response options:

OD2_MASA CR LF	- command carried out.
OD2_I CR LF	- - command understood but not accessible at this moment.

Response format:

1	2	3	4-12	13	14	15	16	17	18	19
D	2	spacja	masa	spacja	jednostka			spacja	CR	LF

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

The requisite for reading the fast dosing threshold value is the selected dosing procedure that includes 'Dose automatically' step.

4.24. Give Scale 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 in between inverted commas.

Example:

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

4.25. Simulation of Pressing ENTER/PRINT Key

Format: **SS CR LF**

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

All weighing conditions (result control, stable mass readout) have to be fulfilled during command sending.

4.26. Change Platform

Applies to the HX7 dual platform scale exclusively.

Format: **PN CR LF**, where **N** - platform number (1 or 2).

Response options:

PN_OK CR LF	- command carried out.
PN_I CR LF	- command understood but not accessible at this moment.
ES CR LF	- command not recognised (platform number incorrect).

4.27. 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 recognised (mass format incorrect).

Command carried out for Parts Counting working mode.

4.28. 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 recognised (mass format incorrect).

Command carried out for Percent Weighing working mode.

4.29. Activate Sound Signal

Format: **BP_TIME CR LF**, where: _ - space, TIME - value specifying how long the sound lasts, parameter given in [ms]. 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 recognised (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.***

4.30. 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 weighing device screen, it is provided in a currently selected language.
n - parameter, decimal value determining working mode number.

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-packaged 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
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

4.31. Set Working Mode

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

Example:

OMS_2 CR LF - command sent from a computer.
OMS_OK CR LF - Parts counting mode has been set.

4.32. 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 weighing device 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.
OMG_2_Parts Counting CR LF - currently set mode: Parts Counting.

4.33. 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.
UI_I <CR><LF>	- command understood but not accessible at this moment.

x - unit symbols, separated by means of commas.

Example:

UI CR LF- return available units.
UI_"kg,N,lb,u1,u2"_OK CR LF - response: available units.

4.34. Set Unit

Format: **US_x CR LF**

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.

x - parameter, unit symbols: g, kg, N, lb, oz, ct, u1, u2, next.

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

Example:

US_kg CR LF - set „kg" unit.
US_kg_OK CR LF - „kg" has been set.

4.35. 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 - return the current unit.
UG_kg_OK CR LF – currently set unit: „kg".

4.36. Give Scale Type

Format: **BN CR LF**

Response options:

BN_A_"x" CR LF	- command understood, response: weighing device type.
BN_I CR LF	- command understood but not accessible at this moment.

x - weighing device type (inserted in between inverted commas).

Example:

BN CR LF - return weighing device type.
BN_A_"HX7" CR LF – weighing device type: „HX7".

4.37. 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 - return Max capacity.
FS_A_"3.000" CR LF – Max capacity: „3.000".

4.38. 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 - return program version.
RV_A_"1.0.0" CR LF – program version: „1.0.0".

4.39. Set AUTOZERO Function

Format: **A_n CR LF**, where: _ - space; **n** – autozero value.

Response options:

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

n - parameter, decimal value determining autozero state: 0 – autozero off, 1 – autozero on.

Example:

A_1 CR LF – turn autozero function on.
A_OK CR LF – autozero function is on.

4.40. User Logging

Format: **LOGIN_NAME,PASSWORD CR LF,** where: _ - space, **NAME** - operator name, **PASSWORD** - operator password

Response options:

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

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

4.41. User Logout

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).

4.42. Send All Implemented Commands

Format: **PC CR LF**

Response:

PC_A_"Z,T,S,SI,SIA,SU,SUI,C1,C0,CU1,CU0,DH,ODH,UH,OUH,D1,D2,OD1,OD2,OT,UT,SS,P,NB,M,RM,BP,OMI,OMS,OMG,UI,US,UG,BN,FS,RV,A,LOGIN,LOGOUT,PC" - command carried out, the indicator displays all implemented commands.

5. MANUAL PRINTOUT / AUTOMATIC PRINTOUT

It is possible to generate printouts either manually or automatically.

- Manual printout is generated for stable weighing result. Load the platform, wait for a stable result and press **ENTER/PRINT** key.
- Automatic printout is generated for stable weighing result. Load the platform, wait for a stable result. No key needs to be pressed.

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

Example:

_ _ _ _ _ _ 1 8 3 2 . 0 _ g _ _ CR LF - a printout generated from a weighing device on pressing **ENTER/PRINT** key.

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