User Manual

Weighing Module MW-04

User manual no.:
ITKU-83-01-03-13-A

BALANCES AND SCALES

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MARCH 2013

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1. INTENDED USE

Weighing module **MW-04** series is intended to design industrial load cell scales. Depending on application, communication with the weighing module can be carried out through the following interfaces: RS232, RS485, Ethernet and Profibus. The MW-04 is designed for cooperation with terminals PUE 5 or PC computers.

Operating of the weighing module MW-04 from a PC level is carried out with a computer software **"MwManager"**. A detailed description of the application is included in the further section of the weighing module user manual.

2. PRECAUTIONARY MEASURES

A. Before putting into use read carefully this user manual. Use the device as intended;

B. Weighed loads should be placed possibly in the central section of the weighing platform;

C. The weighing platform should be loaded with objects which gross weight does not exceed the maximum capacity;

D. Do not leave heavy loads on the weighing platform for longer period of time;

E. In case of failure, immediately unplug the device from power supply;

F. Devices that are to be decommissioned should be decommissioned according to valid legal regulations;

3. WARRANTY CONDITIONS

A. RADWAG is obliged to repair or change those elements that appear to be faulty by production or construction reason,

B. Defining defects of unclear origin and outlining methods of their elimination can be carried out only in participation of the user and the manufacturer representatives,

C. RADWAG does not take any responsibility connected with defects or loss deriving from unauthorized or inappropriate (not adequate to manuals) production or service processes,

D. Warranty does not cover:
  - Mechanical failures caused by inappropriate exploitation of the device or failures of thermal or chemical origin or,
  - Defects caused by atmospheric discharge, overvoltage in mains or other random event,
  - Maintenance activities (cleaning of the weighing module).
E. Warranty loss appears if:
  - A repair is carried out by an unauthorized service,
  - Intrusion into mechanical or electronic construction of unauthorized personnel,
  - Removing or destroying protection stickers for the weighing module.
F. The detailed warranty conditions are listed in the warranty certificate.

4. TECHNICAL DATA

MODEL	MW-04-1	MW-04-2	MW-04-3
Number of platforms in standard	2		
Max number of platforms	4		
Interface	RS232, Ethernet	RS232, RS485	RS232 PROFIBUS
4IN/4OUT module	YES	YES	NO
Housing	Aluminum		
IP rating	IP65		
Power supply	100 ÷ 240VAC 50 ÷ 60Hz		
Power consumption	25W		
Working temperature	-10°C ÷ 40°C		
Maximum quantity of divisions from converter	8388608		
OIML class	III		
Number of verification intervals	6000		
Maximum signal increase	19,5mV		
Maximum voltage per verification interval	3,25uV		
Minimum voltage per verification interval	0,4uV		

Minimum load cell impedance	80
Maximum load cell impedance	1200
Load cell excitation voltage	5V
Load cell connectivity	4 or 6 wires

*) – interface Profibus DP is assembled interchangeably with the module 4IN/4OUT (both modules are not assembled at the same time).

Accessories:

Additional weighing platform module: **DP-4**

4.1. INPUT/OUTPUT parameters

The module features 4 optoisolated inputs, and 4 outputs type OptoMOS.

Output parameters	
No. of outputs	4
Outputs type	OptoMOS
Maximum switchable current	0,2A DC
Maximum conducted voltage	50V DC

Inputs parameters	
No. of inputs	4
Inputs type	optoisolated
Control voltage range	5 -24V DC

5. CONSTRUCTION

The weighing module MW-04 series comprises a metal housing. The signal cables are assembled on glands. MW-04 communicates with peripheral devices through one of the available interfaces: RS485, RS232, Ethernet, Profibus.

The weighing module enables cooperating with a terminal PUE 5 series or a PC computer. It features 4 optoisolated inputs and 4 outputs type OptoMOS. The MW-04 is supplied from mains 100-240VAC.

5.1. View
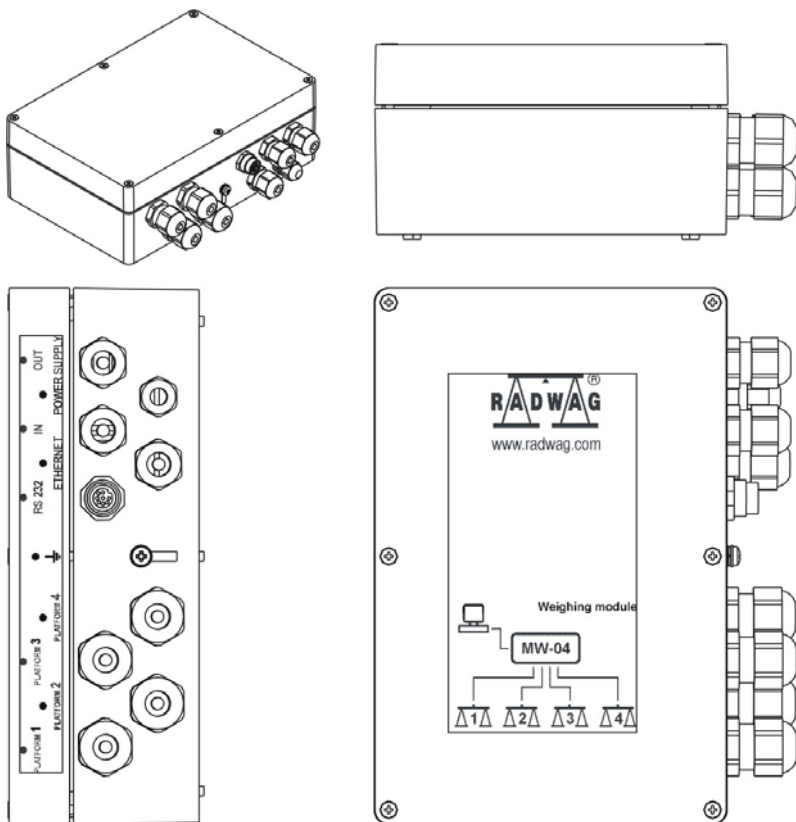
Fig. 1 Weighing module MW-04

5.2. Dimensions
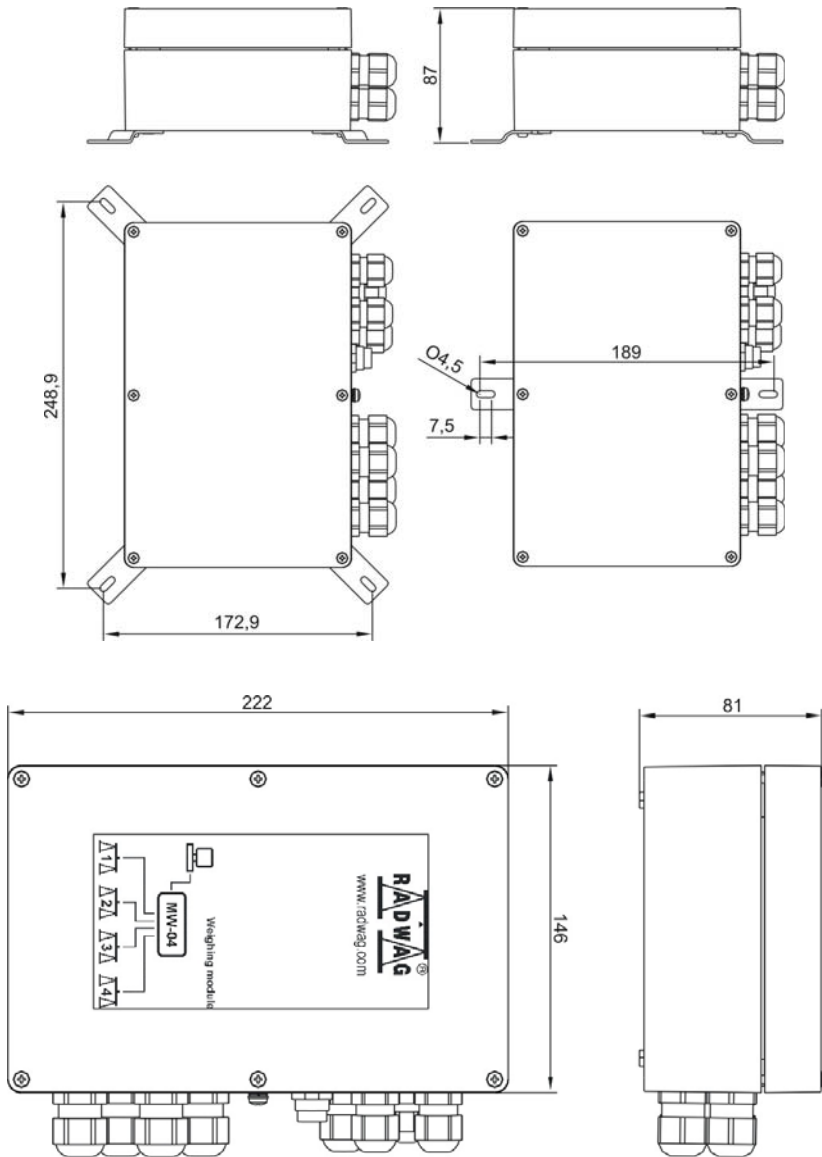
Fig. 2 Dimensions MW-04

5.3. Description of sockets and slots

Weighing module MW-04 series features interfaces sockets located at the main board. All cables are assembled in the housing using glands.
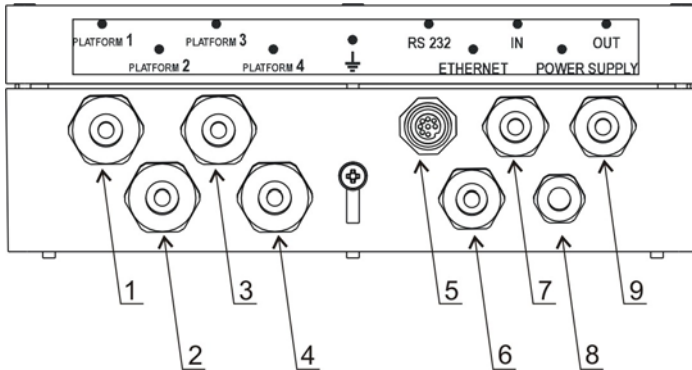
Fig.3 Schedule and description of sockets on the main board of the weighing module MW-04 series

1- Gland PG11 of weighing platform 1
2- Gland PG11 of weighing platform 2
3- Gland PG11 of weighing platform 3
4- Gland PG11 of weighing platform 4
5- Socket M12 8P for RS232
6- Gland M16 for Ethernet cable, RS485 or PROFIBUS (depending on module version)
7- Gland M16 for 4IN cable
8- Gland M12 for feeder cable 230VAC
9- Gland M16 for 4OUT cable

Description of RS 232 socket:

RS232		Pin2 – RxD Pin3 – TxD Pin5 – GND

5.4. Diagrams of connecting cables

Cable: RS232 – DB9/F

DB9/F female   **"M12" 8pin**

signald from PC
GND - pin5
RxD - pin2
TxD - pin3

2 green
3 brown
5 grey

solder side
view
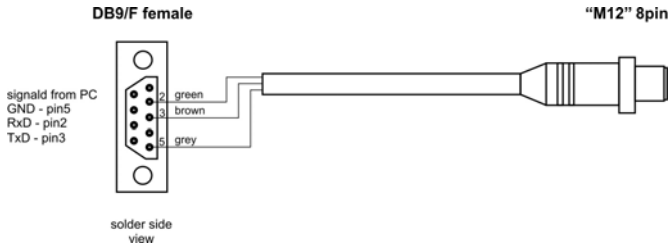
Fig. 4 Cable PT0020

Cable: RS485

To 334Rxxxx board
J11

A - green + orange
B - white green + white orange

A ◄────

A

B ◄────

B

SHIELD
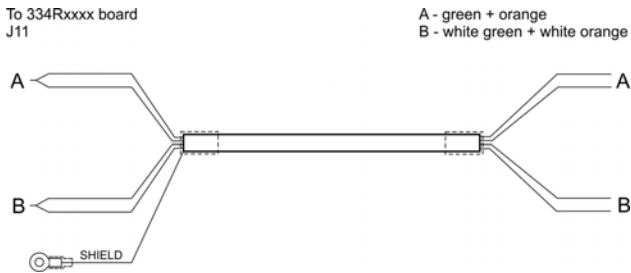
Fig. 5 Cable PT0012

Cable: Ethernet

pin1 - white orange
pin2 - orange
pin3 - white green
pin4 - blue
pin5 - white blue
pin6 - green
pin7 - white brown
pin8 - brown

pin8 - brown
pin7 - white brown
pin6 - green
pin5 - white blue
pin4 - blue
pin3 - white green
pin2 - orange
pin1 - white orange

8

1

1

8

top side
view

top side
view
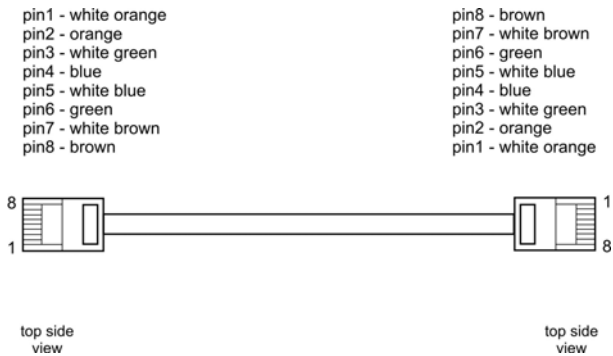
Fig. 6 Cable PT0224

Cable: IN/OUT

To the I/O module
345Rxxxx J2

Leads number → | INPUT Number →

1 - IN1
2 - IN2
3 - IN3
4 - IN4
5 - COMM
6 - +12V
7 - GND

1 - IN1
2 - IN2
3 - IN3
4 - IN4
5 - COMM
6 - +12V
7 - GND

To the I/O module
345Rxxxx J3

Leads number → | OUTPUT Number →

1 - OUT1
2 - OUT2
3 - OUT3
4 - OUT4
5 - COMM
6 - +12V
7 - GND

1 - OUT1
2 - OUT2
3 - OUT3
4 - OUT4
5 - COMM
6 - +12V
7 - GND
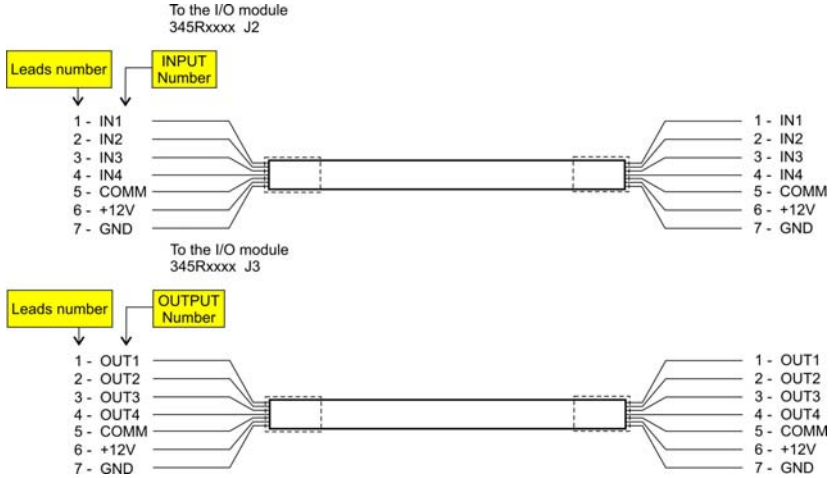
Fig. 7 Cable PT0209

Cable: PROFIBUS

stick the label
with "A"

green
A

A green

stick the label
with "B"

red
B

B red
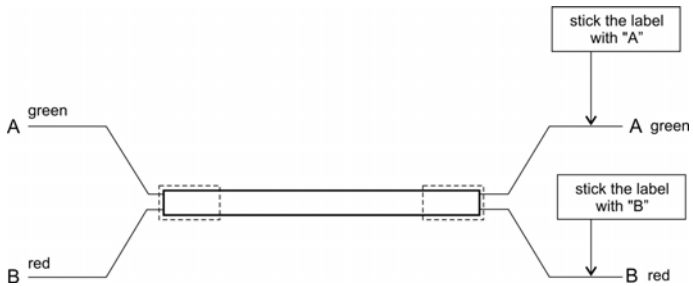
Fig. 8 Cable no. PT0225

6. 4IN/4OUT MODULE

The 4IN/4OUT module is assembled on the main board of the weighing module MW-04 series. The in and out signal cables are assembled using glands.

6.1. IN/OUT diagram

| Inputs diagram | Outputs diagram |
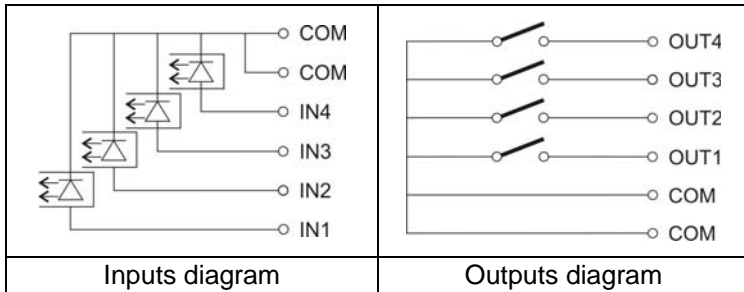
6.2. Description on IN/OUT cables

The signals are available on two cables, one for inputs and the other for outputs. Below table demonstrates distribution of signals on each wire of the cable.

CABLE for INPUTS		CABLE for OUTPUTS	
WIRE no.	SIGNAL	WIRE no.	SIGNAL
1	IN1	1	OUT1
2	IN 2	2	OUT2
3	IN3	3	OUT3
4	IN4	4	OUT4
5	COM	5	COM
6	+12V	6	+12V
7	GND	7	GND

Signals +12VDC and GND are connected to the feeder of the weighing module MW-04.

7. INSTALLATION of "MwMANAGER" software

Caution:

- *In order to install the program on the computer with an older version of the "MwManager" software, first uninstall the previous software version.*

- *The installation manual was made for Windows XP and it is compatible with former versions of MS Windows.*

  Proper operation of the software requires installing Microsoft .NET Framework ver. 2.0 or higher. It is accessible on Microsoft website.

- *Proper operation of the program requires installing all accessible ServicePacks for your operating system, that are supplied by Microsoft.*

- *Due to continuous software updates there may occur some discrepancies between the instruction and the program.*

- *RADWAG company takes no responsibility for the consequences of the software operation, and any errors resulting from the incorrect software operation.*

- *RADWAG company takes no responsibility for loss or protection of any data caused by the incorrect use of the software or computer.*

7.1. Minimum hardware requirements

Correct software operation requires a computer with below specified configuration:

- A PC computer with installed OS MS Windows 2000/XP/2003/Vista/7,

- processor 2.4 GHz or faster,

- RAM 512 MB or more (recommended 1 GB),

- At least 1 GB of free space on the hard drive,

- Display with minimum resolution 800 x 600 pixels,

- DVD drive.

7.2. Installation procedure

1. When having the software installation version, run it with **MwManager x.x.x.x.exe** file. Select one of software language version and press OK button.
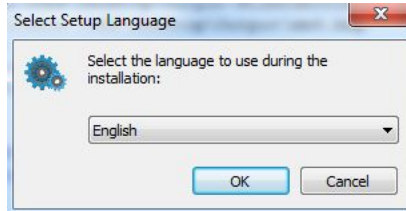
2. Press **"Next"** in the welcoming window.

3. Window for specifying installation directory:
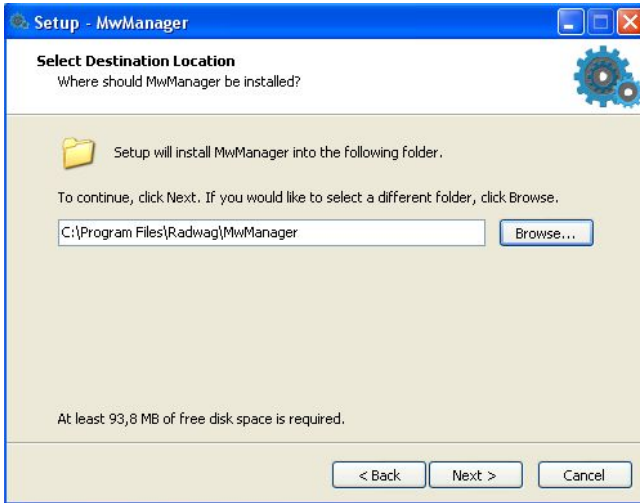
Use the window to specify software location on the computer (default: do not change the path), and press **"Next"** button.

4. Window for selecting tasks:
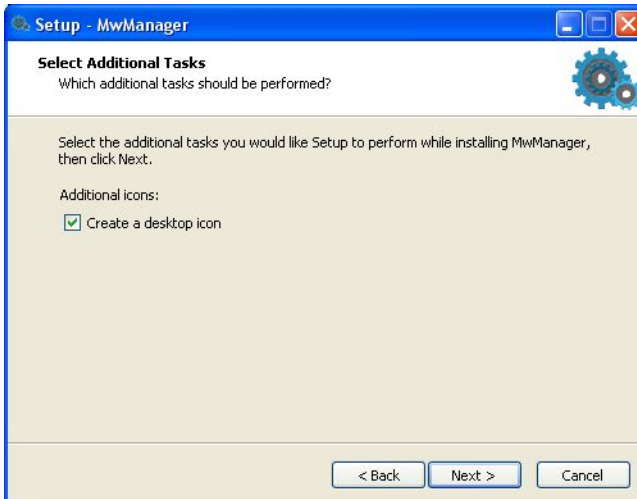
Mark / unmark options and press **"Next"** button.

5. Window on readiness to carry out installation process:
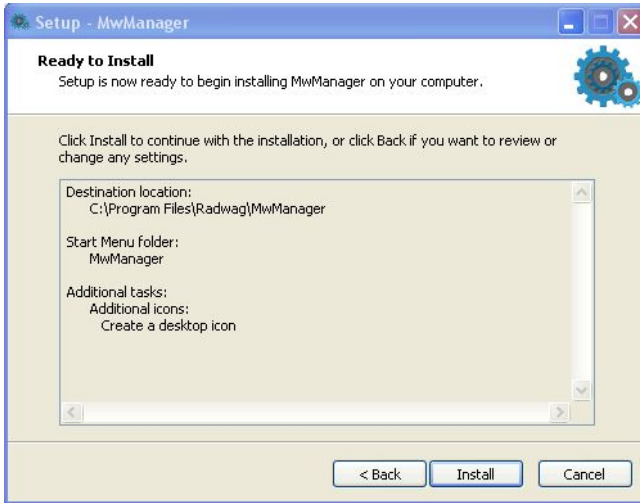
To continue press **"Install"** button.

6. Window on completion of software installation process:

Successfully installed application should be closed by pressing
"Close" button.

7. A shortcut will be created on computer's desktop.

8. PC PROGRAM DESCRIPTION

Operation of the weighing module from PC computer level requires application "**MwManager"**. The application can operate in MS Windows environment with installed add-on **.NET framework 2.0**.

The software enables reading mass value, tarring, zeroing, filter setting, simulating operation of inputs and dosing function for an individual weighing platform. Setting a function, inputs and outputs is enabled for an individual weighing platform.

Caution:

1. *This manual complies with the software "MwManager" starting from version 1.0.3.1 and software of the weighing module MW-04 series from version 1.1*

2. *The entered values are accepted by pressing Enter button. The changes are saved in the weighing module on pressing Save button. All temporary parameters settings that are not saved in the weighing module are highlighted in red.*

3. *The look of some windows of software "MWManeger" depends on the number of operated A/D converters, connected weighing platforms and their configuration in the weighing module MW-04 series.*

8.1. Weighing window

Fig. 9 View of the software's weighing window

On completing initialization procedure, the weighing window displays below pictograms:

➤ 0 ◀ - precise zero indication

◣◢ - stable measurement result

kg - weighing unit

△1△ - weighing platform number

Function buttons:

[→0←]	-	Zeroing
[→T←]	-	Tarring
>>1<< 2 3 4	-	Weighing platform selection, enabled in case the MW-04 cooperates with more than one weighing platform.

Caution:
Zeroing and tarring functions are enabled for an active weighing platform.

8.2. Application settings

The ⚙ Application Settings tab comprises the settings for connecting with the weighing module, choosing interface language version and other software options.

8.2.1. Connection settings

The ⚙ Application Settings tab, Connection Settings button enables a function for establishing connection with the weighing module.
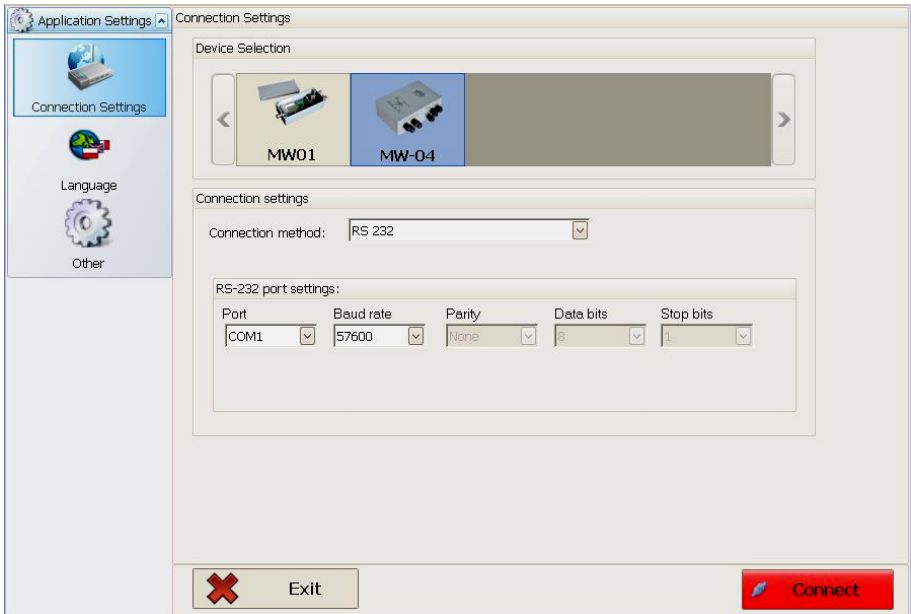
Fig. 10 Connection settings window

In order to establish a connection with the weighing module MW-04, go to tab "Select device" and mark option.

Description:

Select device	Device you want to connect to:
	Weighing module MW-01 series
	Weighing module MW-04 series Mark in case of establishing connection with the weighing module MW-04 series

Means of connection	Interface for connecting to the weighing module
RS 232	Connection via RS232 socket
TCP/IP	Ethernet connection
RS 485	Connection via RS 485 network
Offline	The offline mode is used for saving and editing all indispensable parameters of the configuration file.

RS232:

Port	Choosing a COM port number to which the weighing module is plugged
Baud rate	Baud rate for the RS232 interface. **57600** bps by default
Parity	Parity bit parameter. "None" by default (non-editable value)
Data bits	Number of data bits. 8 by default (non-editable value)
Stop bits	Number of stop bits. 1 by default (non-editable value)

TCP/IP:

IP address	IP address of the device, default setting **192.168.0.2**
Port	Port set in the weight module, default setting **4001**

RS485:

Port	Choosing a COM port number to which the weighing module is plugged
Baud rate	Baud rate for the RS232 interface. **57600** bps by default
Parity	Parity bit parameter. "None" by default (non-editable value)
Data bits	Number of data bits. 8 by default (non-editable value)
Stop bits	Number of stop bits. 1 by default (non-editable value)
Address	Weighing module address in network

Caution:

1. *The default baud rate of RS232 and RS485 interfaces in the **MW-04** is set to **57600** bps by default.*

2. *If case of problems with establishing a connection to the weighing module via interfaces RS232, RS485, set and check accessible baud rates or connect through Ethernet interface.*

Description of buttons:

 Establishing a connection with the weighing module. After connecting, the button changes its function to "Disconnect" and colour of the button changes to green.

 Terminating communication with the module. In case of terminating communication with the module, the button changes its function to "Connect" and its colour changes to red.

8.2.2. Language

Use tab, and button to open a window enabling changing the language of the software.
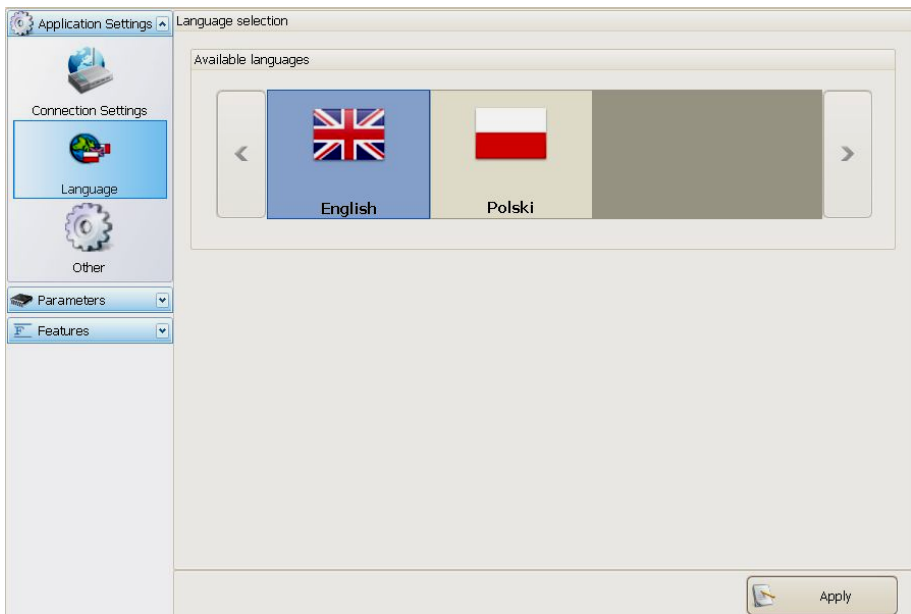
Fig. 11 Software language version selection window

On selecting the language version, press **"Apply"** button to save the changes. Present software version provides access to the following language versions:

- English
- Polish

8.2.3. Other

Use Application Settings tab, Other button to start other software options.
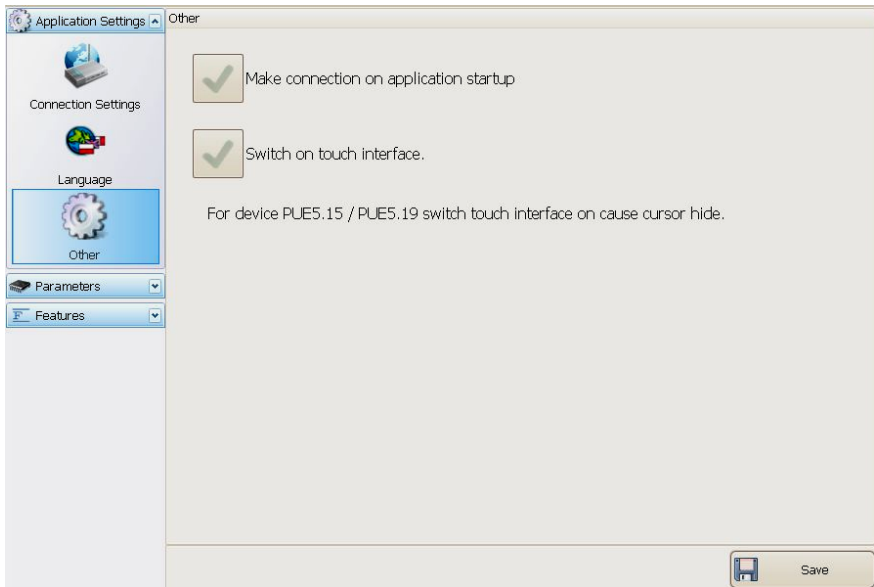
Fig.12 Other options window

Mark **"autostart"** option, and after switching on the software automatically establishes connection to the weighing module, using default or last used means of connection.

Mark **"Enable touch screen interface"** option to adapt the look of software **"MwManager"** to operation on weighing terminal PUE5 series and enabling operation of the touch screen display.

8.3. Parameters

Tab Parameters comprises all user parameters, communication parameters of the weighing module and functions of inputs / outputs.

8.3.1. User Parameters

Tab Parameters , User parameters button enables opening a window with user parameters of the weighing module. The displayed parameters are visible for an enabled (active) weighing platform and they are editable for each software user.
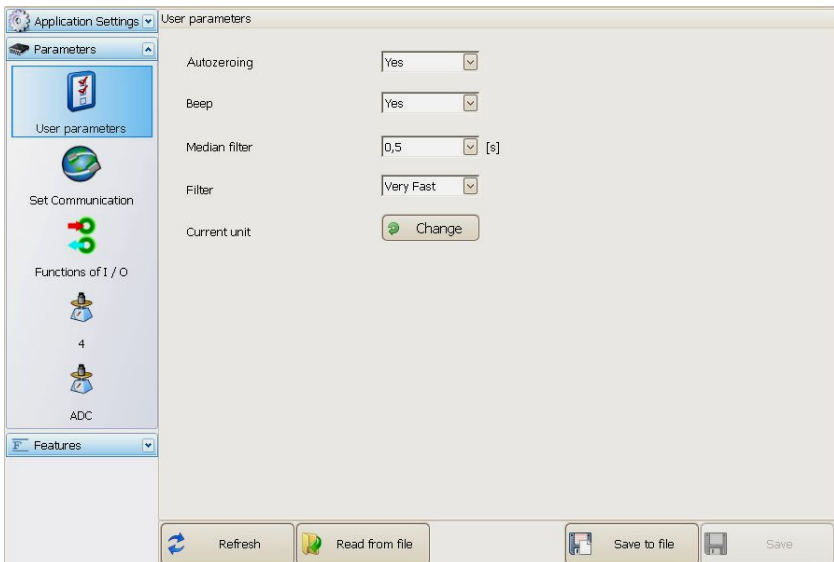
Fig.13 User parameters window

List of user parameters:

Auto-zeroing	-	YES / NO - enabling / disabling auto-zeroing function
Beep	-	Beep sound (not operated by the weighing module MW-04)
Median filter	-	Setting the value of median filter. None – means disabling the median filter
Filter	-	Setting the speed of averaging filter operation None – means disabling the filter
Current unit	-	Toggling between weighing units in the weighing window

Caution:

In case the MW-04 operates a few weighing platforms, then the displayed parameters enable editing only the weighing platform currently previewed in the weighing window:

8.3.2. Communication settings

Tab Parameters , Set Communication button opens a window with communication parameters of the weighing module. The parameters are previewed and accessible for editing for each software user who establishes communication with the weighing module.

- **Ethernet**
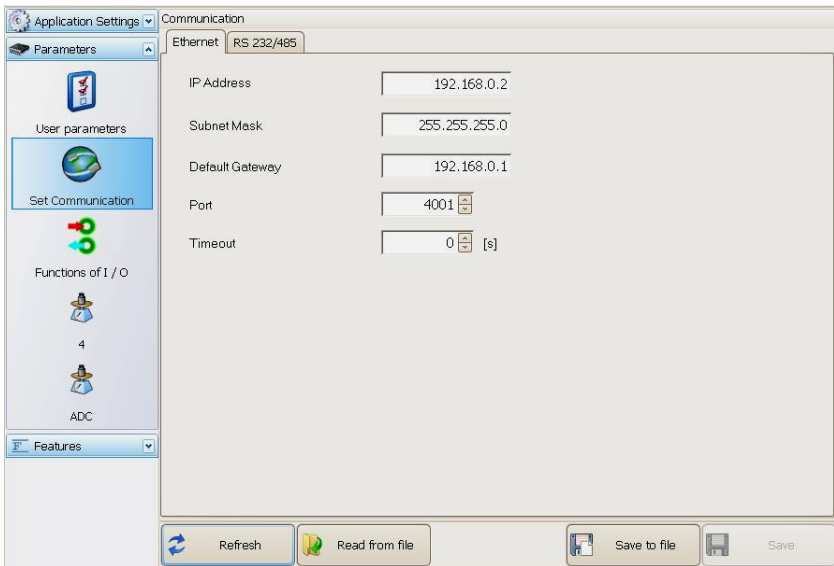
Fig.14 Communication parameters window for Ethernet

Description of window fields:

IP address	-	Device's IP address, default **192.168.0.2**
Subnet mask	-	Ethernet subnet mask, default **255.255.255.0**
Default gate	-	Ethernet default gate, default **192.168.0.1**
Port	-	TCP communication port, default **4001.**
Timeout	-	Inactivity time in which the device breaks communication, expressed in seconds, range 0 – 300 [s].

- **RS 232/485**
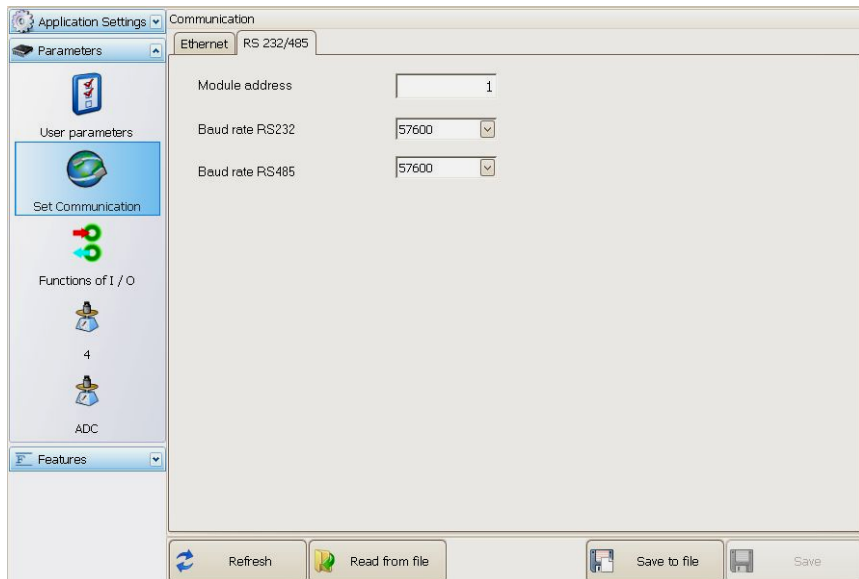
Fig.15 RS communication parameters window

Description of window fields:

Module address	-	Weighing module address in RS 485 network (the network requires setting different address for each of the devices), default set to **1**. Range from 1 to 254.
Baud rate RS232	-	Baud rate setting for RS 232 communication interface. Default **57600** bit/s
Baud rate RS485	-	Baud rate setting for RS 485 communication interface. Default **57600** bit/s

On changing the communication parameters, save the settings and restart the weighing module (by unplugging and repeated plugging to mains) to make changes effective.

Remember, that the new parameters are inserted in the connection settings window with the weighing module. *See chapter 8.2.1 of this user manual.*

8.3.3. IN / OUT functions

The weighing module MW-04 series comprises four inputs and four outputs.

Use tab ![Parameters], Functions of I / O button to open a window enabling software user to access configuring functions of the weighing module's inputs and outputs. Each input and output requires selecting number of a scale / weighing platform for which its function should be carried out.
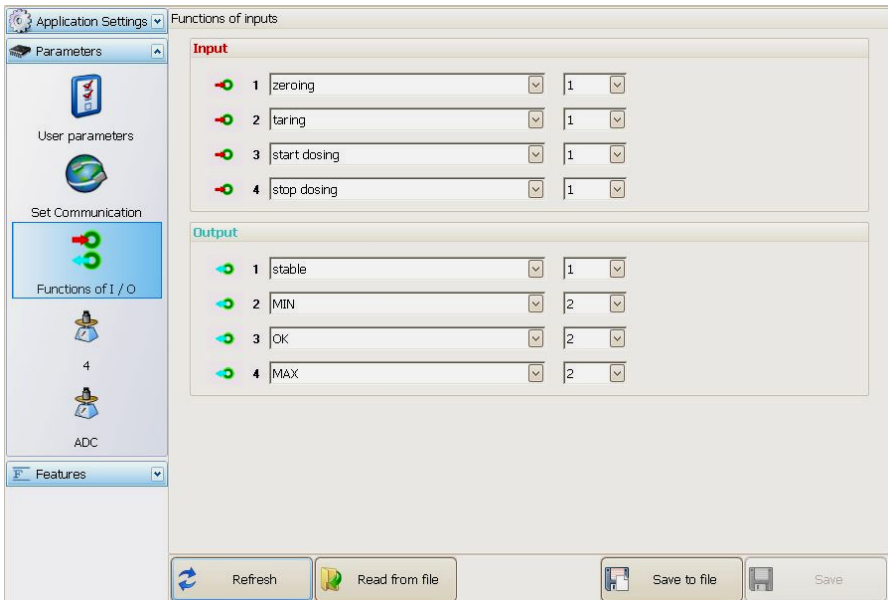
Fig. 16 Inputs / Outputs configuring window

- **Inputs configuration**

    Functions accessible for inputs:

None	Input disabled
Tarring	Tarring of an individual platform
Zeroing	Zeroing of an individual platform
Start dosing	Initiate dosing process on an individual platform
Stop dosing	Stop dosing process on an individual platform

- **Outputs configuration**

    Functions accessible for outputs:

None	Output disabled
Stable	Signaling stable weighing result over LO mass limit, on an individual platform
MIN stable	Signaling stable weighing result over LO mass limit but below MIN limit, on an individual platform
MIN	Signaling unstable weighing result over LO mass limit but below MIN limit, on an individual platform
OK stable	Signaling stable weighing result between MIN and MAX limits, on an individual platform
OK	Signaling unstable weighing result between MIN and MAX limits, on an individual platform
MAX stable	Signaling stable weighing result over MAX limit, on an individual platform
MAX	Signaling unstable weighing result over MAX limit, on an individual platform

Caution:
If a function is assigned to a specific output and the same output is used for bulk or fine dosing then on dosing start and continuation the outputs will be activated compatibly to the dosing parameters. End of the dosing process causes switching over the functions to outputs.

8.3.4. Previewing available weighing platforms

Tab ![Parameters], ![button] button opens a simultaneous view of weighing windows of all weighing platforms operated by the weighing module MW-04. Additionally, for information purposes, each weighing platform features data on number A/D converter divisions (or converters), adjustment factor and start mass.

Caution:
Window look depends on number of used A/D converters, connected weighing platforms and their configuration.
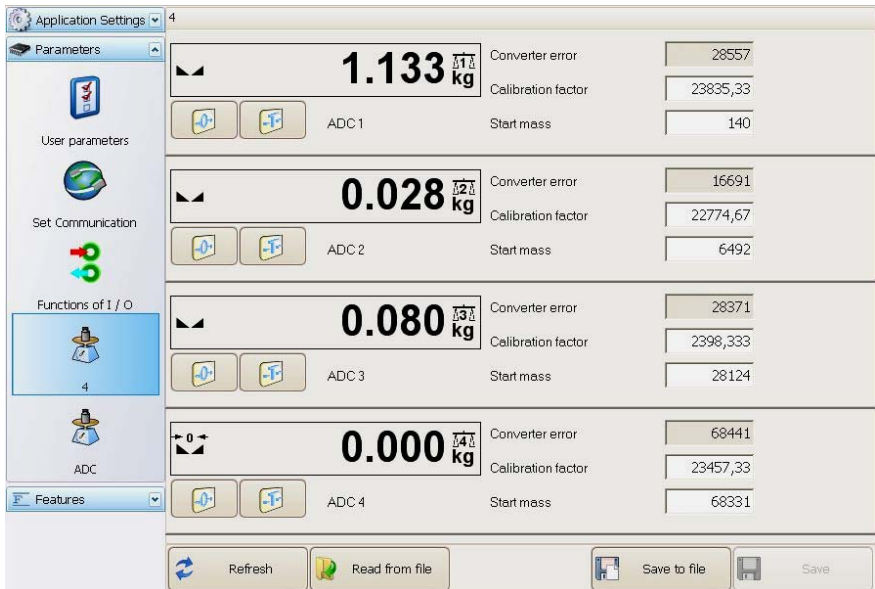
Fig. 17 An example of a window for previewing four weighing platforms

8.3.5. Previewing accessible A/D converters

Tab Parameters, ADC button enables previewing divisions, adjustment factor, mass, correction factor and start mass of all available A/D converters.

Caution:
Window look depends on number of used A/D converters, connected weighing platforms and their configuration.
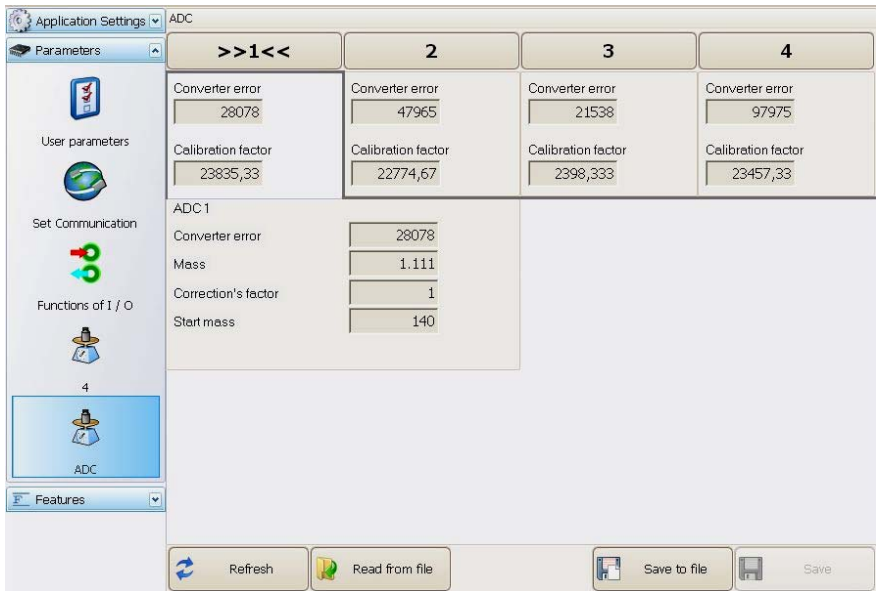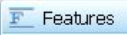
Fig. 18 Window for previewing divisions from A/D converters

8.4. Functions

Tab ⬚ Features to set functions of dosing, checkweighing, inputs and outputs status and simulation.

8.4.1. Dosing

Tab ⬚ Features , Dosage button opens a window for settings dosing process parameters of a weighing platform that is active in the weighing window.
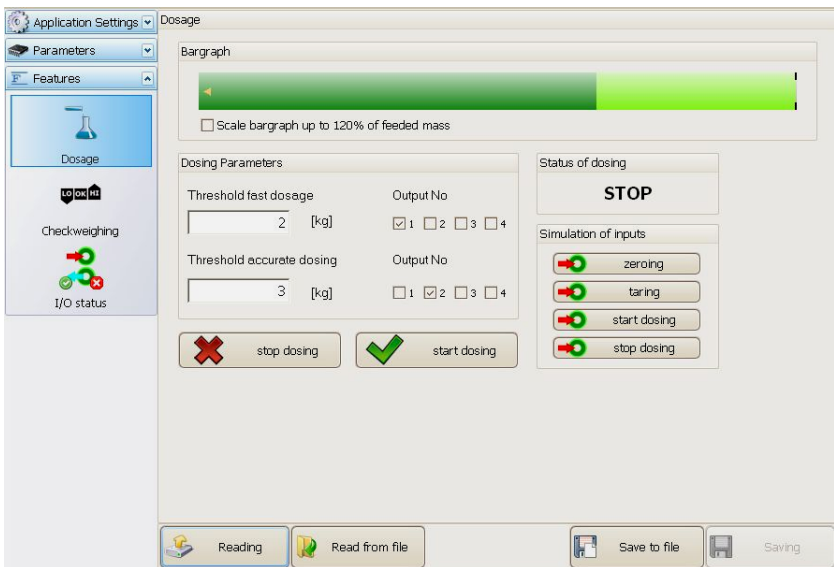
Fig. 19 Window on dosing parameters

- **Bargraph**

  The dosing window features a graphic bar visualizing mass indication within the weighing range of the weighing module.

  Ticking the additional option extends bar graph scaling to 120 % of the maximum dosing limit. If the fine dosing threshold is disabled, then the bargraph is scaled according to the bulk dosing threshold.

Fig. 20 Bargraph scaling for the bulk dosing limit

Fig. 21 Bargraph scaling for the bulk and fine dosing limits

Fig. 22 Bargraph for low mass without scaling

Fig. 23 Bargraph for the same low mass with enabled scaling option

- **Dosing parameters**

Fig. 24 Window for setting dosing parameters

The dosing process can consist of one or two phases depending on the needs.

Description of fields:

Threshold fast dosage	Output No
Mass value for which the first dosing phase is completed. (switching to the second dosing phase, or and of dosing process in case of single-phase dosing process.)	Selection of output number or outputs numbers enabled during the first dosing phase (and for an active weighing platform).

Threshold accurate dosing	Output No
Mass value for which the second dosing phase is completed. (End of dosing process)	Selection of output number or outputs numbers enabled during the second dosing phase (and for an active weighing platform).

- **Dosing status**

The dosing status window displays in the weighing window the current status of dosing process on an active weighing platform.

Description:

	Dosing process status:
Dosing status	DOSAGE – dosing in progress TERMINATED – dosing terminated by pressing STOP button. STOP – dosing stopped, COMPLETED – Dosing completed.

- **Simulation of inputs operation**

    Inputs simulation enables simulating the operation of a function assigned to an individual input. *See chapter 8.3.3 of this user manual.*

Simulation of inputs	
zeroing	→ Button of function assigned to input 1
None	→ Button of function assigned to input 2
start dosing	→ Button of function assigned to input 3
stop dosing	→ Button of function assigned to input 4
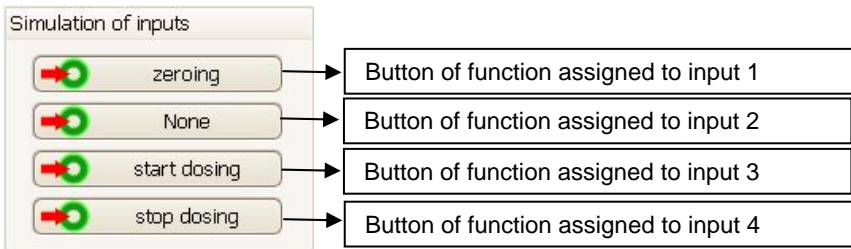
- **Dosing simulation**

    The bottom section of the window comprises buttons for starting and stopping dosing process. They enable starting and stopping the dosing process independently on the functions assigned to the inputs.

8.4.2. Checkweighing

Start option ![Features] and press ![Checkweighing] button to open a window enabling checkweighing setting for a weighing platform that is active in the weighing window.
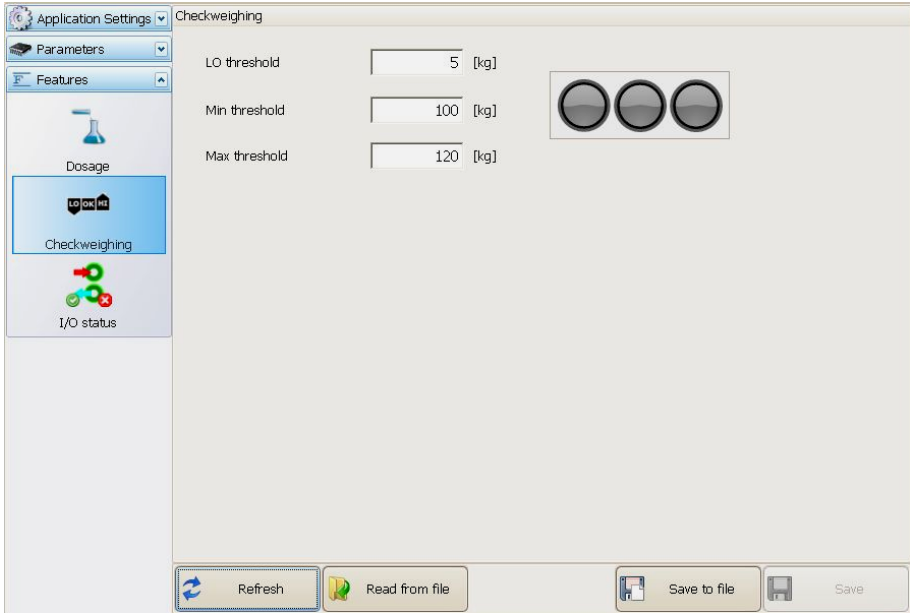
Fig. 25 Checkweighing settings window

Description of fields:

LO threshold	Value of net mass, above which the checkweighing function is active
Min threshold	Mass value for determining the value of tolerance thresholds. - below the **Min threshold** value the MIN limit is signaled - between the values of **Min threshold - Max threshold** the
Max threshold	OK limit is signaled. - above the **Max threshold** value the MAX limit is signaled.

Signaling function with limits:

	MIN
	OK
	MAX

Caution:
The checkweighing signalization in the software is accessible on setting the functions to outputs.

8.4.3. Input/output status

Start option F Features and press I/O status button to open a window enabling setting inputs signalization and setting outputs status.
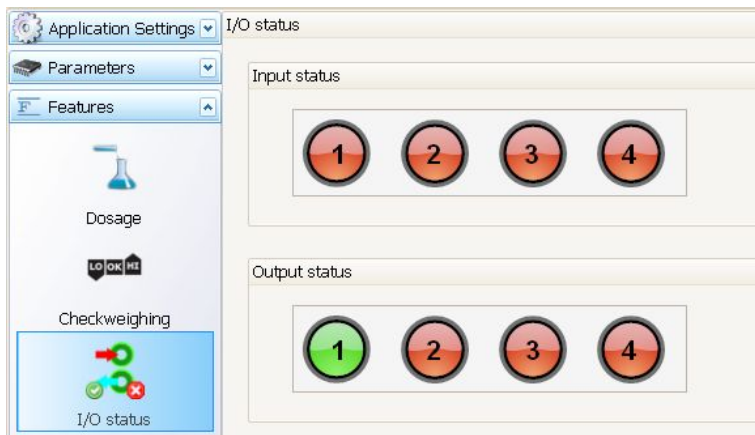
Fig. 26 Window of inputs and outputs status

Software inputs and outputs are numbered according the weighing module documentation.

(green 1)	input / output enabled
(red 1)	input / output disabled

The simulation of output operation is possible on pressing the output number which is activated immediately, provided there is no function assigned to the output.

The simulation of inputs is accessible in the dosing window.

9. WEIGHING

Place weighed load on the weighing platform. As the stable measurement pictogram ⊿ is displayed, read the measurement result.

Caution:
In case the weighing module MW-04 cooperates with more than one weighing platform, pay attention that the weighing window previews the corresponding weighing platform for reading mass of weighed loads.

9.1. Principles of use

In order to ensure a long lasting operation and correct measuring of weighed loads it is advised to:

- Place loads to be weighed on the weighing platform gently and avoiding shocks:
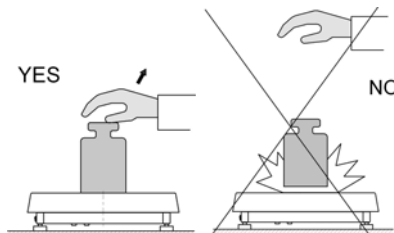
- Place the loads in the centre of the weighing platform (eccentric weighing errors are outlined in the standard PN-EN 45501 sections 3.5 and 3.6.2):
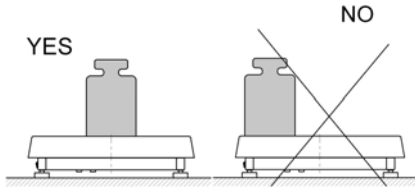
- Do not load the weighing platform with concentrated force:
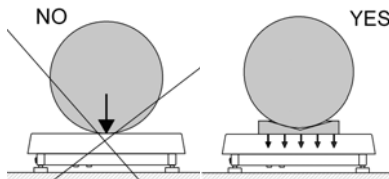
- Avoid side loads and particularly side shocks:
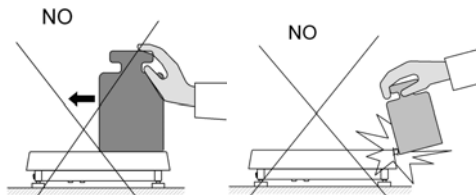
9.2. Zeroing

In order to zero the mass indication of an active weighing platform in program

"MwManager" press [-0-] button in the weighing window (located in the the top right corner of the window) or enable the zeroing function.

The display should indicate mass equal to zero and pictograms: $\rightarrow 0 \leftarrow$ and ▾.

Zeroing is equivalent to setting a new zero point comprehended by the scale as a precise zero point. Zeroing is possible only for stable display status.

Zeroing can be carried out by pressing the external push-button connected to an input configured to zeroing function.

Caution:
*Zeroing display status can only be carried out within the ±2% of the maximum scale capacity. If a zeroed indication is beyond the range ±2% of maximum scale indication, the display indicates an error message **Err2**.*

The procedure of defining inputs – buttons is described in chapter 8.3.3 of this user manual.

9.3. Tarring

In order to determine net weight of a load weighed on an active weighing platform , place a container on the weighing platform and on indication stabilization press button or enable tarring function. The display should indicate mass equal to zero and pictograms: *Net* and ◣◢. The scale is tarred.

While using the tarring function pay attention not to exceed the maximum measuring range (maximum capacity) of a scale. When taking the load and its packaging off the weighing platform the display indicates value that is a sum of tarred weights preceded by minus sign.

Tarring can be carried out by pressing the external push-button connected to an input configured to tarring function.

Caution:
*Tarring cannot be carried out if the scale display indicates zero or negative values. In such case the display indicates an error message **Err3**.*

The procedure of defining inputs - buttons is described in chapter 8.3.3 of this user manual.

9.4. Weighing on dual range scales

Switching between the **1st range** and the **2nd range** takes place automatically, without operator's interference, (and at the point of reaching the Max of the **1st range**).

Weighing in **range II** is signaled by displaying pictogram →|2|← in the top left corner of the display. When unloading the weighing platform, the indication returns to zero. Weighing in the **2nd range** continuous until the indication returns to zero indication.

Fig. 27 Weighing window in the 2nd range

Return from weighing in the **II range** to weighing in the **I range** takes place automatically on removing the weighed load from the weighing platform and at the moment the mass indication returns to AUTOZERO zone – confirmed by pictogram →0← appearing on the display. Then the pictogram of the **II range** →|2|← disappears from the display and the scale automatically returns to weighing with the accuracy of the **I range**.

9.5. Toggling between weighing units

Change of a weighing unit of an active weighing platform is carried out in a weighing window of the **"MwManager"** software by pressing ⟳ Change button in user parameters.
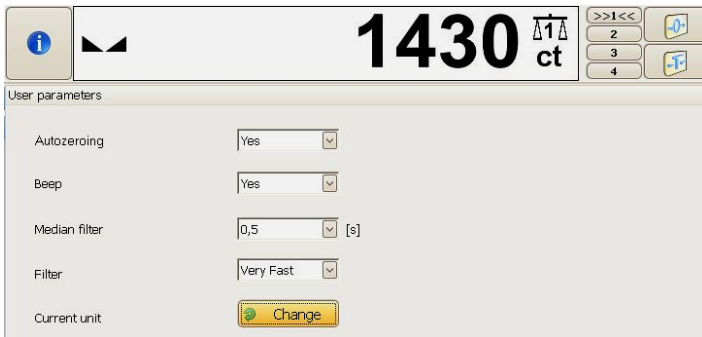
Fig. 28 The main window with changed weighing unit

Selection options:

- If the basic weighing unit is [kg], the following units are accessible: [kg, lb, oz, ct, N, g]. *For verified scales, [lb, oz, N] are not accessible*;
- If the basic weighing unit is [g], the following units are accessible: [g, kg, lb, oz, ct, N] *For verified scales, [lb, oz, N] are not accessible.*

10. SCALE PARAMETERS

Users can adjust the scale to ambient conditions (filtering level) or user needs (autozero operation).

The parameters are grouped in tab Parameters >User parameters and they are accessible and editable for an individual weighing platform in the weighing window.

List of scale parameters:

- Autozeroing
- Median filter
- Filter

10.1. Autozero function

In order to ensure precise scale indications the software "AUTOZERO" function has been introduced. It is designed to automatically control and correct scale's zero indication.

When autozero function is enabled, the subsequent results are compared in constant time intervals. If two subsequent results differ less than the declared AUTOZERO range, e.g. 1 interval, the scale automatically sets new zero point and pictograms of stability – ◣◢ and precise zero – →0← are displayed.

If AUTOZERO is enabled, then each measurement always starts from the precise zero point. There are, however, cases in which the function may disturb the measuring process. It is for instance while very slow loading the weighing platform (for instance pouring a load). In such case the zero correcting system can correct the actual indication of load placed on the scale's weighing platform.

Procedure:

- Enter the group of **User parameters** window by pressing User parameters button, choose parameter **<Autozeroing>** and set its appropriate value.

> **NO** - autozero disabled
> **YES** - autozero enabled

10.2. Median filter

The intended use of the median filtering is eliminating short lasting interference of impulse character (e.g. mechanical shocks).

Procedure:
- Enter the group of **User parameters** window by pressing

 User parameters button, select **<Median filter>** parameter and determine its value.

Accessible settings:

> **None** - median filter disabled
> **0.5, 1, 1.5, 2, 2.5** - median filter enabled

10.3. Filter

The intended use of the averaging filter is adapting the scale to ambient conditions at a workstation.

Procedure:
- Enter the group of **User parameters** window by pressing

 User parameters button, select parameter **<Filter>** and determine its value.

Accessible settings:

> None, Very Fast, Fast, Average (normal), Slow

Caution:
The higher filtering level, the longer stabilization time of measurement result.

11. CHECKWEIGHING

Checkweighing is a function that aims at precise weighing a sample with pre-defined low and high weighing limits (checkweighing thresholds (LO – sample mass too low, HI – sample mass too high, OK – sample mass correct).

Such software solution is a very good means for quick mass value evaluation with no need for continuous monitoring the measurement result. The above mentioned weighing status (LO, OK, HI) have their graphic visualization presented on scale's display.

The status is also indicated by optical signalization or controlled by the set of external devices.

Fig. 29 Presentation of intervals for checkweighing function

Caution:
The means of enabling the checkweighing mode and its signalization are described in chapter 8.4.2 of this user manual.

11.1. LO threshold

Parameter **<LO threshold>** determines the net mass value indicated on the display which activates operation of outputs for status MIN, OK, MAX.

Procedure:

- Enter parameter **<LO threshold>,** determine the value of **LO** limit and press

  Enter button. Save changes by pressing [Save] button. The changes are saved in weighing module permanent memory.

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11.2. MIN/MAX threshold

Parameter **<MIN threshold>** in checkweighing mode determines the net weight limit for switching between the status from MIN to OK.

Parameter **<MAX threshold >** in checkweighing mode determines the net weight limit for switching between the status from OK to MAX.

Output signalization is activated over the set net value of **LO threshold**.

Procedure:

- Enter parameter **< MIN threshold >** or **< MAX threshold >,** determine the limit value and press **Enter** key. Save changes by pressing

  ![Save button] button. The changes are saved in weighing module permanent memory.

12. DOSING

Dosing is a function enabling precise load measurement to a pre-defined target value.

Dosage

Parameter **<Threshold fast dosage>** determines in fast (bulk) dosing the value of net mass below which one or a few outputs are enabled. (the outputs that are assigned to bulk dosing)

Parameter **< Threshold accurate dosing >** determines in slow (fine) dosing the value of net mass below which, but above the value of the bulk dosing limit, one or a few outputs are enabled. (the outputs that are assigned to fine dosing).
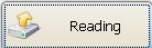
Procedure:

- Enter parameter **< Threshold fast dosage >** or **< Threshold accurate dosing >,** determine the limit value and press **Enter** button. Save

  changes by pressing ![Saving button] button.

- The changes are confirmed by a message:

- If any changes in limits values are introduced and but not saved, then

  it is possible to preview the currently set limits by pressing [Reading] button.

- The readout is confirmed by a message:
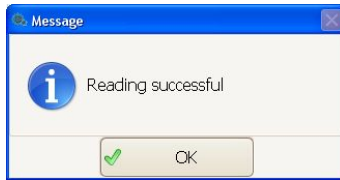
Caution:
Description and parameters of dosing mode is described in chapter 8.4.1 of this user manual.

13. PARAMETERS IN FILE

"MwManager" software enables saving set parameters in a file format ***.sav**. The function can be used for saving weighing module settings in a backup copy, which is restorable in case of module defect or further use of the parameters while configuring larger number of weighing modules.
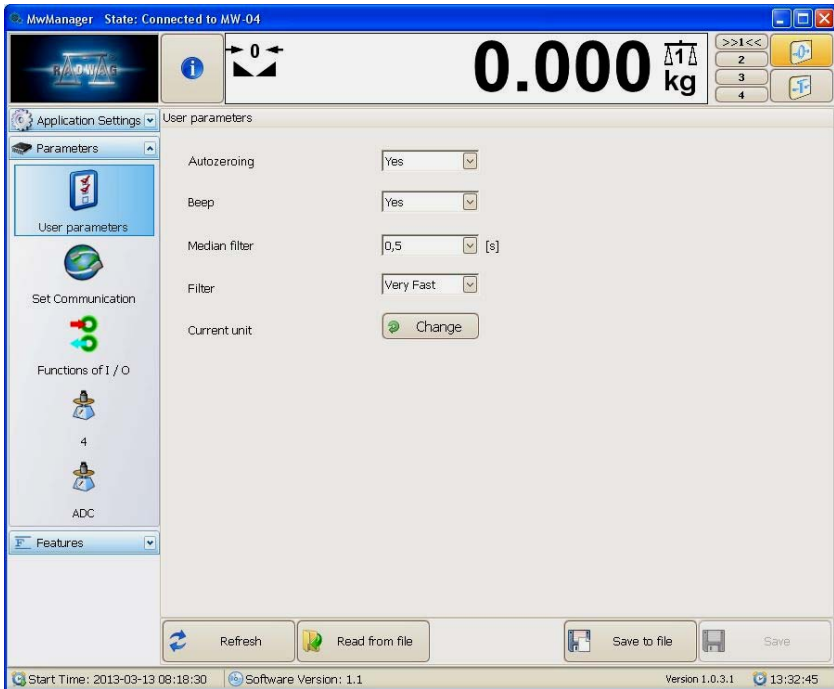
Fig. 30 An instance of a window with accessible option for saving and reading a file.

File format:

MW04_(factory number)_YYYY-MM-DD_HH-MM.sav

13.1. Saving to file

Procedure:

- As the weighing module parameters are set, press [Save to file] button to save them in a file.

- Then, using system operation window browse for file saving directory, and press [Save] button.

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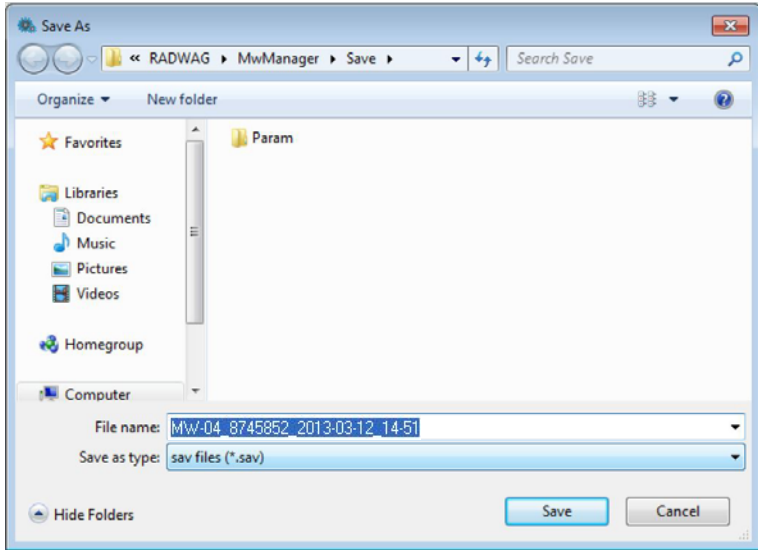
Fig. 31 System window "Save as"

- Correctly saved parameters are followed by displaying the below message:
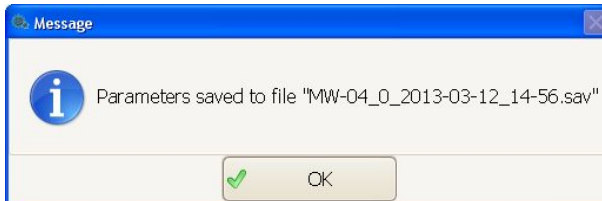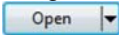
Caution:
The system window look depends on installed OS version, and may differ from the one visible in Fig.30.

13.2. Uploading file data

Procedure:

- In order to upload parameters from a file, press [Read from file] button,

- Then, using system dialogue window, see fig. 31, select a previously saved file, and press [Open ▾] button.
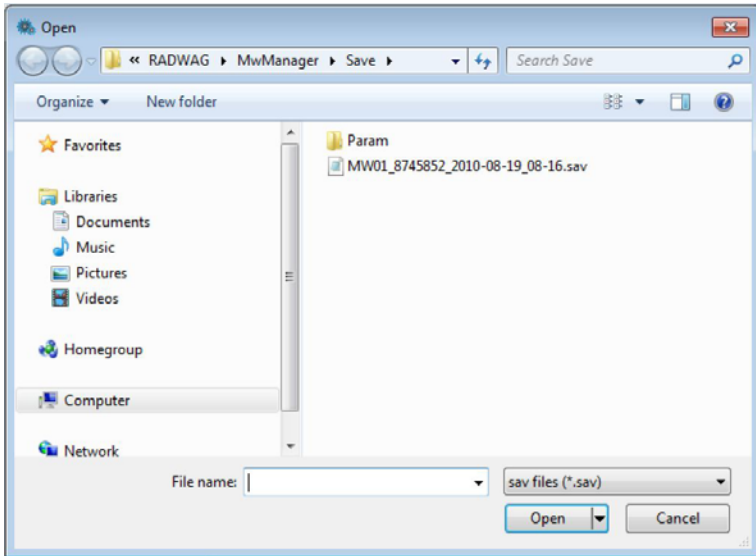
Fig. 32 System window „Open"

- Next, using window for uploading groups of parameters select one or all parameters to be uploaded to the weighing module.
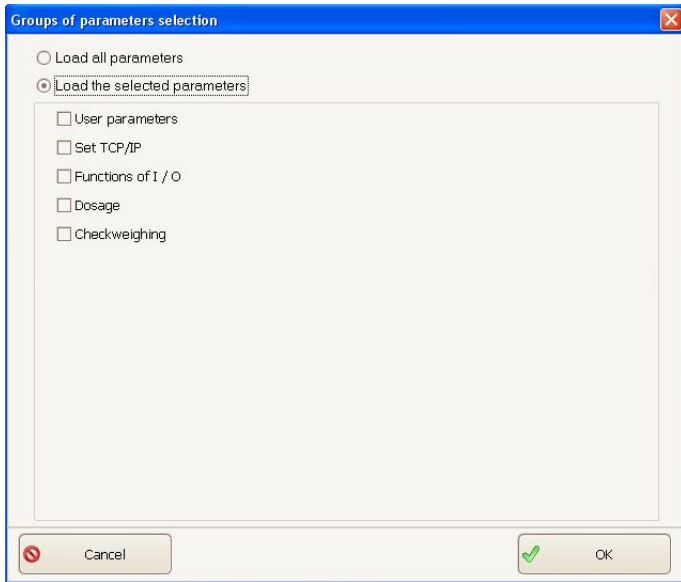
Fig.33 Window for selecting groups of parameters.

The selected parameters are grouped according to their location in the main software menu.

- Parameters that are correctly uploaded are confirmed by the below message:
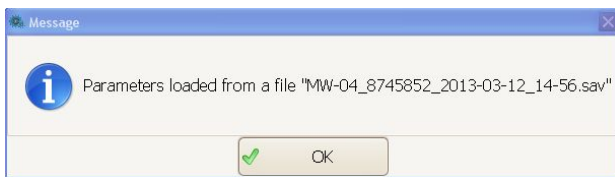
14. OFFLINE MODE

The **Offline** mode enables starting different software options with no need to connect to a weighing module. This means of connection is created to enable saving parameters without establishing a physical connection to a weighing device.
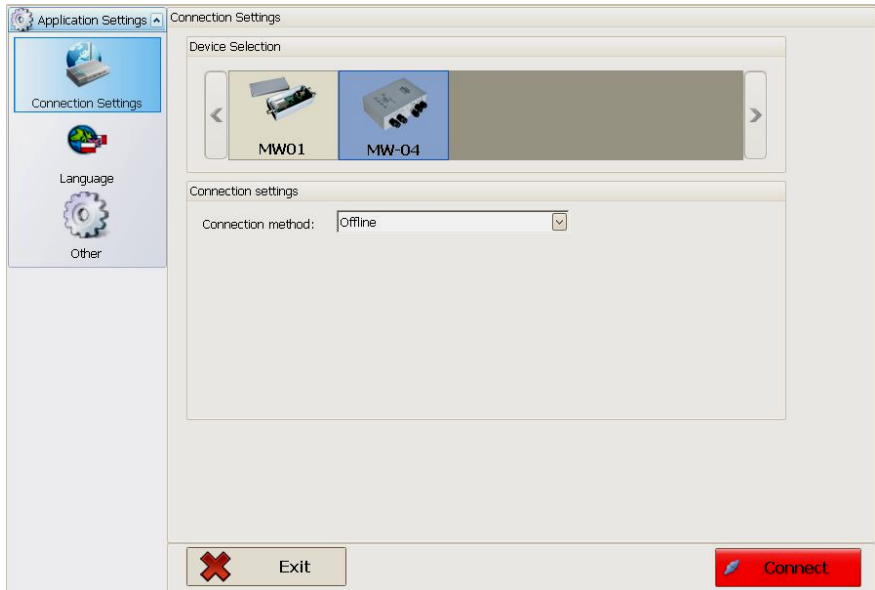
Fig.34 Window for enabling the Offline mode.

Procedure:

- On software start, enter connection settings tab and in the connection settings options select **Offline**, and press **"Connect"** button.

- The weighing window displays a message "Offline".

- Set parameters and save them into a file according to description in chapter 13.1 of this user manual.

15. ERROR MESSAGES

Err2	-	Value out of zeroing range
Err3	-	Value out of tarring range
Err8	-	Tarring / Zeroing operation timeout
NULL	-	Zero value from A/D converter
FULL	-	Maximum measuring range exceeded
HI	-	Data to be displayed exceeds maximum display capacity
LH	-	Start mass error, indication out of range (from -5% to +15% of start mass)

16. COMMUNICATION PROTOCOL

16.1. General information

A. Serial communication protocol "weighing module – terminal"
   is designed for establishing communication between a RADWAG
   scale and a peripheral device through interfaces: RS232, RS485 and
   Ethernet.

B. The protocol consists of commands sent from a peripheral
   device to the scale, and responses sent inversely.

C. The responses are sent from the scale on each receipt
   of a command. Each response is a reaction for a specific command.

D. Commands which form serial communication protocol enable checking
   device's status, and trigger its reaction, e.g. obtaining measurement
   result, etc.

16.2. A set of commands recognized by the module

Command	Description of command
Z	Zero scale
T	Tare scale
OT	Give tare value
UT	Set tare
S	Send stable result in basic weighing unit of an active weighing platform
SI	Immediately send the result in basic weighing unit of an active weighing platform
SP	Immediately send the result in basic weighing unit of a *n* weighing platform
SIA	Immediately send the result from all weighing platforms in basic weighing units
SU	Send the stable result in current weighing unit
SUI	Immediately send the result in current weighing unit
C1	Switch on continuous transmission in basic weighing unit
C0	Switch off continuous transmission in basic weighing unit
CU1	Switch on continuous transmission in current weighing unit
CU0	Switch off continuous transmission in current weighing unit

DH	Set low checkweighing threshold
UH	Set high checkweighing threshold
ODH	Give value of low checkweighing limit
OUH	Give value of high checkweighing limit
P	Set platform n
PC	Send all implemented commands

Caution:

1. *Each command has to be terminated with CR LF characters;*

2. *When sending subsequent commands without waiting for a response from a previous one may result in scale losing some of the commands. The best policy for communication is not sending another command until the answer for a former command has been received.*

16.3. Response message format

After receiving an order, the scale can reply with:

XX_A CR LF	command understood and in progress
XX_D CR LF	command completed (appears only after XX_A)
XX_I CR LF	command understood but not accessible at this moment
XX _ ^ CR LF	command understood but max range is exceeded
XX _ v CR LF	command understood but min range is exceeded
XX _ OK CR LF	command carried out (completed)
ES_CR LF	command not recognized
XX _ E CR LF	an error occurred on command carrying out (time limit exceeded while waiting for stable measurement result (time limit is scale's characteristic parameter)

XX   - stands for a name of sent command
_   - substitutes spaces

16.4. Description of commands

16.4.1. Zero scale

Format: **Z CR LF**

Accessible responses:

Z_A CR LF	- command understood and in progress
Z_D CR LF	- command carried out
Z_A CR LF	- command understood and in progress
Z_^ CR LF	- command understood but zeroing range exceeded
Z_A CR LF	- command understood and in progress
Z_E CR LF	- time limit exceeded while waiting for stable measurement result
Z_I CR LF	- command understood but not accessible at this moment

16.4.2. Tare scale

Format: **T CR LF**

Accessible responses:

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

16.4.3. Give tare value

Format: **OT CR LF**

Response: **OT_TARE CR LF** - command carried out

Response format:

1	2	3	4-12	13	14	15	16	17	18	19
O	T	space	tare	space	unit			space	CR	LF

Tare - 9 characters with right justification
Unit - 3 characters with left justification

Caution:
Tare value is always given in adjustment unit.

16.4.4. Set tare

Format: **UT_TARE CR LF**, where **TARE** - tare value

Accessible responses:

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)

Caution:
Use dot in tare format as decimal point.

16.4.5. Send stable result in basic weighing unit of an active weighing platform

Format: **S CR LF**

Accessible responses:

S_A CR LF   - command understood and in progress
S_E CR LF   - time limit exceeded while waiting for stable measurement result

S_A CR LF   - command understood and in progress
S_I CR LF   - command understood but not accessible at this moment

S_A CR LF   - command understood and in progress
MASS FRAME   - response is mass value in basic measuring unit for an active
                      platform

Mass frame format which is scale's response:

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
is mass value in basic measuring unit.

16.4.6. Immediately send the result in basic weighing unit of an active weighing platform

Format: **SI CR LF**

Accessible responses:

SI_I CR LF   - command understood but not accessible at this moment

MASS FRAME   - response is mass frame in basic weighing unit for an active
platform

Mass frame format which is scale's response:

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 of mass value in basic weighing unit

16.4.7. Immediately send the result in basic weighing unit of a *n* weighing platform

Format: **SPn CR LF**, where **n** – weighing platform no. (from 1 to 4)

Accessible responses:

SPn_I CR LF   - command understood but not accessible at this moment
MASS FRAME "Pn" CR LF   - immediate response of mass value in basic weighing unit for **n** weighing platform

Mass frame format from **n** weighing platform which is scale's response:

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

Where:
>   **n**   - weighing platform number
>   **Mass**   - 9 characters with right justification
>   **Unit**   - 3 characters with left justification

16.4.8. Immediately send the result from all weighing platforms in basic weighing units

Format: **SIA CR LF**

Accessible responses:

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

MASS FRAME "P1" ; MASS FRAME "P2" ; MASS FRAME "P3" ; MASS FRAME "P4" CR LF - immediate response of mass value from each of all weighing platforms in basic weighing unit

Mass frame format for each of weighing platforms which is scale's response:

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

Where:
      n   - weighing platform number
      Mass   - 9 characters with right justification
      Unit   - 3 characters with left justification

Example:

Assume the weighing module is connected with two 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 understood, immediate responses are mass values from all weighing platforms in basic weighing unit of each of the weighing platform. Where: **P 3 _ I** – platform 3 not accessible, **P 4 _ I** - platform 4 not accessible

16.4.9. Send the stable result in current weighing unit

Format: **SU CR LF**

Accessible responses:

SU_A CR LF   - command understood and in progress
SU_E CR LF   - time limit exceeded while waiting for stable measurement result

SU_A CR LF   - command understood and in progress
SU_I CR LF   - command understood but not accessible at this moment

SU_A CR LF   - command understood and in progress
MASS FRAME   - response is mass value in current weighing unit

Mass frame format which is scale's response:

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 is mass value in current weighing unit.

16.4.10. Immediately send the result in current weighing unit

Format: **SUI CR LF**

Accessible responses:

SUI_I CR LF   - command understood but not accessible at this moment
MASS FRAME   - response is mass value in current weighing unit

Mass frame format which is scale's response:

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, response is mass value in current weighing unit
Where: _ - space

16.4.11. Switch on continuous transmission in basic weighing unit

Format: **C1 CR LF**

Accessible responses:

C1_I CR LF   - command understood but not accessible at this moment
C1_A CR LF   - command understood and in progress
MASS FRAME   - response is mass value in basic weighing unit

Mass frame format which is scale's response:

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

16.4.12. Switch off continuous transmission in basic weighing unit

Format: **C0 CR LF**

Accessible responses:

C0_I CR LF   - command understood but not accessible at this moment
C0_A CR LF   - command understood and in progress

16.4.13. Switch on continuous transmission in current weighing unit

Format: **CU1 CR LF**

Accessible responses:

CU1_I CR LF   - command understood but not accessible at this moment
CU1_A CR LF   - command understood and in progress
MASS FRAME   - response is mass value in current weighing unit

Mass frame format which is scale's response:

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

16.4.14. Switch off continuous transmission in current weighing unit

Format: **CU0 CR LF**

Accessible responses:

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

16.4.15. Set low checkweighing threshold

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

Accessible responses:

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

16.4.16. Set high checkweighing threshold

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

Accessible responses:

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

16.4.17. Give value of low checkweighing limit

Format: **ODH CR LF**

Response: **DH_MASA 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 with right justification
Unit - 3 characters with right justification

16.4.18. Give value of high checkweighing limit

Format: **OUH CR LF**

Response: **UH_MASA CR LF** - command carried out

Mass frame format of scale's response:

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

    Mass   - 9 characters with right justification
    Unit   - 3 characters with right justification

16.4.19. Change platform n

Format: **Pn CR LF**, where **n** – weighing platform no. (from 1 to 4)

Accessible responses:

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

16.4.20. Send all implemented commands

Format: **PC CR LF**

Response:

PC_A_"Z,T,S,SI,SP,SIA,SU,SUI,C1,C0,CU1,CU0,DH,ODH,UH,OUH, OT,UT,PC" - command carried out, terminal sent all implemented commands.

17. COMUNICATION MODULE PROFIBUS

17.1. General information

Communication module Profibus ensures exchanging data between a superordinated controlling unit (master) and a weighing module MW-04 (slave) in accordance with protocol Profibus DP.

The superordinated unit (master):

- cyclically reads signals from the weighing module MW-04,
- cyclically saves status to the weighing module MW-04.

Functions of Profibus communication with the weighing module MW-04:

- Mass readout from the weighing module
- Tarring the weighing module
- Zeroing the weighing module
- Reading module's status
- Reading current weighing unit
- Setting and reading tare value
- Setting and reading **LO** threshold value
- START / STOP of dosing process
- Setting and reading the value of bulk (fast) dosing threshold
- Setting and reading the value of fine (slow) dosing threshold
- Reading the status of dosing process
- Setting and reading **Min** threshold value
- Setting and reading **Max** threshold value

17.2. Setting instrument's address in a Profibus network

The address of the weighing module MW-04 in Profibus network has to be set in accordance with module addressing specification. (See point 8.3.2 of this user manual – „Communication settings"). Field *module address* is used to set corresponding address of the device in Profibus network.

17.3. Memory map

17.3.1. Output address

Address \ Offset	0	1	2	3	4	5	6	7	8	9
0	M1	M1	M1	M1	T1	T1	T1	T1	J1	J1
1	S1	S1	LO1	LO1	LO1	LO1	M2	M2	M2	M2
2	T2	T2	T2	T2	J2	J2	S2	S2	LO2	LO2
3	LO2	LO2	M3	M3	M3	M3	T3	T3	T3	T3
4	J3	J3	S3	S3	LO3	LO3	LO3	LO3	M4	M4
5	M4	M4	T4	T4	T4	T4	J4	J4	S4	S4
6	LO4	LO4	LO4	LO4	-	-	-	-	MIN	MIN
7	MIN	MIN	MAX	MAX	MAX	MAX	DS	DS	DS	DS
8	DW	DW	DW	DW	-	-	-	-	-	-
9	-	-	-	-	-	-	-	-	-	-
10	SK	SK	ST1	ST1	ST2	ST2	ST3	ST3	ST4	ST4

Tab. 1

M1   - Mass for weighing platform no. 1, 4 bytes, float
M2   - Mass for weighing platform no. 2, 4 bytes, float
M3   - Mass for weighing platform no. 3, 4 bytes, float
M4   - Mass for weighing platform no. 4, 4 bytes, float
T1   - Tare for weighing platform no. 1, 4 bytes, float
T2   - Tare for weighing platform no. 2, 4 bytes, float
T3   - Tare for weighing platform no. 3, 4 bytes, float
T4   - Tare for weighing platform no. 4, 4 bytes, float
J1   - Current weighing unit for weighing platform no. 1, 2 bytes, word
J2   - Current weighing unit for weighing platform no. 2, 2 bytes, word
J3   - Current weighing unit for weighing platform no. 3, 2 bytes, word
J4   - Current weighing unit for weighing platform no. 4, 2 bytes, word
S1   - Status of weighing platform no. 1, 2 bytes, word
S2   - Status of weighing platform no. 2, 2 bytes, word
S3   - Status of weighing platform no. 3, 2 bytes, word
S4   - Status of weighing platform no. 4, 2 bytes, word

LO1 - LO threshold of weighing platform no. 1, 4 bytes, float
LO2 - LO threshold of weighing platform no. 2, 4 bytes, float
LO3 - LO threshold of weighing platform no. 3, 4 bytes, float
LO4 - LO threshold of weighing platform no. 4, 4 bytes, float
MIN - MIN threshold of an active platform, 4 bytes, float
MAX - MAX threshold of an active platform, 4 bytes, float
DS - Bulk (fast) dosing threshold of an active platform, 4 bytes, float
DW - Fine (slow) dosing threshold of an active platform, 4 bytes, float
SK - Adjustment status of an active platform, 2 bytes, word
ST1 - Process status for weighing platform no. 1, 2 bytes, word
ST2 - Process status for weighing platform no. 2, 2 bytes, word
ST3 - Process status for weighing platform no. 3, 2 bytes, word
ST4 - Process status for weighing platform no. 4, 2 bytes, word

17.3.2. Input address

Address Offset	0	1	2	3	4	5	6	7	8	9
0	C	C	CP	CP	P	P	T	T	T	T
1	LO	LO	LO	LO	-	-	MIN	MIN	MIN	MIN
2	MAX	MAX	MAX	MAX	DS	DS	DS	DS	DW	DW
3	DW	DW	-	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-	-	MW	MW
5	MW	MW	-	-	-	-	-	-	-	-

Table. 2

C - Command, 2 bytes, word
CP - Command with a parameter, 2 bytes, word
P - Selected (active) weighing platform
T - Tare for a platform, 4 bytes, float
LO - Lo threshold of a platform, 4 bytes, float
MIN - MIN threshold of a platform, 4 bytes, float
MAX - MAX threshold of a platform, 4 bytes, float
DS - Bulk (fast) dosing threshold of a platform, 4 bytes, float
DW - Fine (slow) dosing threshold of a platform, 4 bytes, float
MW - Mass of a standard for a platform, 4 bytes, float

17.4. Description of variables

17.4.1. Output variables

Readout of output variables enables obtaining data on instrument's status.

Caution:
All output values, except for mass, are displayed in adjustment/calibration unit

Name of output variable	address	length [word]	data type
mass of platform no. 1	0	2	float
tare of platform no. 1	4	2	float
unit of platform no. 1	8	1	word
status of platform no. 1	10	1	word
LO of platform no. 1	12	2	float
mass of platform no. 2	16	2	float
tare of platform no. 2	20	2	float
unit of platform no. 2	24	1	word
status of platform no. 2	26	1	word
LO of platform no. 2	28	2	float
mass of platform no. 3	32	2	float
tare of platform no. 3	36	2	float
unit of platform no. 3	40	1	word
status of platform no. 3	42	1	word
LO of platform no. 3	44	2	float
mass of platform no. 4	48	2	float
tare of platform no. 4	52	2	float
unit of platform no. 4	56	1	word
status of platform no. 4	58	1	word
LO of platform no. 4	60	2	float
MIN of an active platform	68	2	float
MAX of an active platform	72	2	float
bulk (fast) dosing threshold of an active platform	76	2	float
fine (slow) dosing threshold of an active platform	80	2	float

adjustment status of an active platform	100	1	word
process status of platform no. 1	102	1	word
process status of platform no. 2	104	1	word
process status of platform no. 3	106	1	word
process status of platform no. 4	108	1	word

Table. 3

- **mass** – mass value in current unit is returned
- **tare** – tare value in calibration/adjustment unit is returned
- **unit** – determines current (displayed) weighing unit

Unit \ Byte no.		B5	B4	B3	B2	B1	B0	Dec
g	gram	0	0	0	0	0	**1**	1
kg	kilogram	0	0	0	0	**1**	0	2
ct	carat	0	0	0	**1**	0	0	4
lb	pound	0	0	**1**	0	0	0	8
oz	ounce	0	**1**	0	0	0	0	16
N	Newton	**1**	0	0	0	0	0	32

- **status** – **status** – determines scale (platform) status

Status byte	Task	Dec
0	correct measurement (no error message from scale)	1
1	stable measurement	2
2	scale in zero indication	4
3	scale tarred	8
4	scale in second weighing range	16
5	scale in third weighing range	32
6	scale reports NULL error	64
7	scale reports LH error	128
8	scale reports FULL error	256

Example:

byte no.	B8	B7	B6	B5	B4	B3	B2	B1	B0
value	0	0	0	0	1	0	0	1	1

The scale does not report an error, the measurement is stable in the second weighing range.

- **LO** - the value of **LO** threshold in calibration/adjustment unit is returned

- **MIN** - set value of **MIN Threshold** (in calibration/adjustment unit) is returned.

- **MAX** - set value of **MAX Threshold** (in calibration/adjustment unit) is returned.

- **Bulk (fast) dosing threshold** – set value of bulk (fast) dosing threshold (in calibration/adjustment unit) is returned.

- **Fine (slow) dosing threshold** – set value if fine (slow) dosing threshold (in calibration/adjustment unit) is returned

- **Adjustment status** – determines the status of adjustment process

Adjustment status	Decimal value
Process not accessible	-1
Process completed successfully	0
Process in progress	1
Error – out of range	2
Error – timeout	3
Determining process aborted	4
Waiting for data	5

- **Process status** – determines the status of dosing process:

Decimal value of a variable (Dec)	Process status	Byte no.	
		B1	B0
0	process disabled (inactive)	0	0
1	dosing start	0	1
2	dosing stop	1	0
3	end of dosing process	1	1

17.4.2. Input variables

Saving the input variables in the weighing module MW-04 enables controlling module's operation.

Caution:
All input values are set in relation to calibration/adjustment unit.

Name of input variable	address	length [word]	data type
command	0	1	word
complex command	2	1	word
Complex command parameters			
platform	4	1	word
tare	6	2	float
LO	10	2	float
MIN	16	2	float
MAX	20	2	float
bulk (fast) dosing threshold	24	2	float
fine (slow) dosing threshold	28	2	float
mass of a standard	48	2	float

Table. 4

- **command** – basic command. Setting of an appropriate command's byte is directly responsible for carrying out a task, in accordance with below table:

command bytes	task	Dec
0	Platform zeroing	1
1	Platform tarring	2
5	dosing process start	32
6	dosing process stop	64
8	Determine start mass	256
9	Determine adjustment factor	512
10	Save factors	1024

Example:

0000 0000 0010 0000 – command carried out, dosing   process start on an active weighing platform.

- **complex command** - Setting of an appropriate command's byte is directly responsible for carrying out a task, in accordance with below table:

command bytes	task	Dec
0	setting tare value of an active platform	1
1	setting **LO** threshold value of an active platform	2
3	setting **MIN threshold** value of an active platform	8
4	setting **MAX threshold** value of an active platform	16
5	setting the value of bulk (fast) dosing threshold of an active platform	32
6	setting the value of fine (slow) dosing threshold of an active platform	64
7	Setting mass of a standard for an active platform	128
8	Setting an active weighing platform	256

Example:

0000 0000 0000 0010 – command carried out, LO threshold set to value given in LO parameter (address 10); See *Table. 4.*

Caution:
A complex command requires setting an appropriate parameter of address from 4 to 48. See *Table. 4.*

- **platform** – complex command parameter – number of an active weighing platform:

Parameter decimal value	Weighing platform no.
0	1 platform
1	2 platform
2	3 platform
3	4 platform

- **tare** – complex command parameter – tare value
  (in calibration/adjustment unit)

- **LO** – complex command parameter – **LO** threshold value
  (in calibration/adjustment unit)

- **MIN** - complex command parameter – **MIN threshold** value
  (in calibration/adjustment unit).

- **MAX** - complex command parameter – **MAX threshold** value
  (in calibration/adjustment unit).

- **bulk (fast) dosing threshold** – complex command parameter –
  value of bulk (fast) dosing threshold (in calibration/adjustment unit).

- **fine (slow) dosing threshold** – complex command parameter –
  value of fine (slow) dosing threshold (in calibration/adjustment unit).

- **mass of a standard** – complex command parameter –
  mass of a standard (in calibration/adjustment unit).

Caution:
A command or a command with a parameter is executed once on detecting
its corresponding byte setting. Should a command with the same byte be
re-executed, first the byte must be reset.

Example:

command	address 1	address 0
tarring	0000 0000	0000 0010
zeroing command bytes	0000 0000	0000 0000
tarring	0000 0000	0000 0010

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