

MODBUS

COMMUNICATION PROTOCOL:

MWLH Weighing Module

MWMH Weighing Module

SOFTWARE MANUAL

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RADWAG®
RADWAG BALANCES AND SCALES
ADVANCED WEIGHING TECHNOLOGIES

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1. GENERAL INFORMATION

Modbus protocol implemented in MWLH and MWMH weighing modules can be applied when serial connector (RTU) or Ethernet (Modbus RTU over TCP, MODBUS TCP) are used.

The protocol enables:

- Operation of a weighing platform (mass readout, taring, zeroing, determining: tare value, LO, MIN and MAX thresholds of every platform, rough and fine dosing thresholds),
- Input status readout,
- Output setting,
- Process stop,
- Process start,
- Adjustment

2. IMPLEMENTED FUNCTIONS

Modbus communication is based on 3 functions:

- 03 (0x03) Read Holding Registers – output data readout,
- 04 (0x04) Read Input Registers – input data readout,
- 06 (0x06) Write Single Register - output data record (one register),
- 16 (0x10) Write Multiple Registers – output data record.

3. MEMORY MAP

3.1. Input Address

Input variables list:

Variable	Address	Length [WORD]	Data type
Platform 1 mass	0	2	float
Platform 1 tare	2	2	float
Platform 1 unit	4	1	word
Platform 1 status	5	1	word
Platform 1 LO threshold	6	2	float
Process status	32	1	word
Inputs status	33	1	word
Min	34	2	float
Max	36	2	float

Fast dosing	38	2	float
Slow dosing	40	2	float
Adjustment status	50	1	word

Platform mass – returns platform mass in current unit.

Platform tare – returns platform tare in an adjustment unit.

Platform unit – determines current mass unit of a given platform.

Decimal value	
1	gram [g]
2	kilogram [kg]
4	carat [ct]
8	pound [lb]
16	ounce [oz]
32	Newton [N]

Platform status – mask

Bit No.	
0	measurement correct (weighing instrument does not report an error)
1	measurement stable
2	weighing instrument indicates zero
3	weighing instrument is tared
4	weighing instrument is in II weighing range
5	weighing instrument is in III weighing range
6	weighing instrument reports NULL error
7	weighing instrument reports LH error
8	weighing instrument reports FULL error

Example:

bit No.	B8	B7	B6	B5	B4	B3	B2	B1	B0
value	0	0	0	0	1	0	0	1	1

The weighing instrument does not report any error, stable measurement in II weighing range.

LO threshold – LO threshold value of a platform in an adjustment unit.

Inputs status – status of set inputs:

Input No	4	3	2	1
OFF	0	0	0	0
ON	1	1	1	1

Example:

Mask of set input 2 and 4: 0000 1010

MIN – set **MIN** threshold value.

MAX – set **MAX** threshold value.

Fast dosing – fast dosing threshold value.

Slow dosing – slow dosing threshold value.

Adjustment status – adjustment process status:

Decimal value	Process status
0	Start mass/adjustment coefficient determination OK
1	Start mass/adjustment coefficient determination in progress
2	Start mass/adjustment coefficient determination range exceeded
3	Start mass/adjustment coefficient determination time exceeded
4	Operation aborted

Feeder status - determines status of the dosing process:

Decimal value	Process status
0	Process disabled
1	Taring in progress
2	Active process
3	Process inhibited
4	Process aborted
5	Process finished
6	Dosing not allowed
-1	Tarring operation error
-2	No process start permission

-3	Breakdown
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3.2. Output Address

Output variables list:

Variable	Address	Length [word]	Data type
Command	256	1	word
Command with parameter	257	1	word
Tare	259	2	float
LO threshold	261	2	float
Outputs status	263	1	word
Min	264	2	float
Max	266	2	float
Fast dosing	268	2	float
Slow dosing	270	2	float
Reference sample mass	280	2	float

Platform – complex command parameter: weighing platform number.

Tare – complex command parameter: tare value (in an adjustment unit).

LO threshold – complex command parameter: LO threshold value (in an adjustment unit).

Outputs status – complex command parameter: status of weighing indicator outputs:

Output No.	4	3	2	1
OFF	0	0	0	0
ON	1	1	1	1

Example:

Mask of active output 2 and 4: 0000 1010

MIN – complex command parameter: MIN threshold value.

MAX – complex command parameter: MAX threshold value.

Fast dosing – complex command parameter: fast dosing threshold value.

Slow dosing – complex command parameter: slow dosing threshold value.

Reference sample mass – complex command parameter: adjustment weight value.

Basic command – setting a respective value results with performance of a given task, see the table:

Decimal value	Command
1	Zero the platform
2	Tare the platform
32	Start
64	Stop (error)
128	Internal adjustment
256	Determine start mass
512	Determine adjustment factor
1024	Save adjustment parameters

Example:

0000 0000 0010 0000 – process start.

Complex command – setting a respective value results with performance of a given task, see the table:


Decimal value	Command
1	Setting tare value for a given platform
2	Setting LO threshold value for a given platform
4	Setting outputs mask
8	Setting MIN threshold value
16	Setting MAX threshold value
32	Setting fast dosing threshold
64	Setting slow dosing threshold
128	Set reference sample mass value



Complex command requires setting address of respective parameter (from 0 to 24 – refer to: "Output variable list" table).

Example:

0000 0000 0000 0010 – command sets LO threshold to the value set in LO parameter.

	<i>A command or a command with a parameter is executed once when its bit setting is detected. If the command with the same bit is to be executed again, zero the bit.</i>
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Example:

Command	
Tare	0000 0000 0000 0010
Zero command bits	0000 0000 0000 0000
Tare	0000 0000 0000 0010



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