

MODBUS RTU

COMMUNICATION PROTOCOL:

PUE 7.1 Indicator

PUE HY10 Indicator

WLY Precision Scales

WPY Multifunctional Scales

HY10 Multifunctional Scales

USER MANUAL

ITKP-09-01-12-18-EN



RADWAG® RADWAG WAGI ELEKTRONICZNE
ZAAWANSOWANE TECHNOLOGIE WAGOWE

DECEMBER 2018

CONTENTS

| | |
|---------------------------------------|----------|
| 1. GENERAL INFORMATION | 4 |
| 2. IMPLEMENTED FUNCTIONS | 4 |
| 3. MEMORY MAP | 4 |
| 3.1. Input Address | 4 |
| 3.2. Output Address | 7 |

1. GENERAL INFORMATION

Modbus RTU protocol implemented in the indicator can be applied when RS232 serial connector or Ethernet are used (Modbus over TCP). The protocol enables:

- Operation of up to 2 weighing platforms (mass readout, taring, zeroing, determining: tare value, LO, MIN and MAX thresholds of every platform),
- Input status readout,
- Output setting,
- Operator selection,
- Product selection,
- Customer selection,
- Packaging selection,
- Warehouse selection,
- Dosing selection,
- Formulations selection,
- Lot number selection,
- Process stop,
- Process start,
- Save/Print,
- Statistics zeroing.

2. IMPLEMENTED FUNCTIONS

Modbus RTU communication is based on 3 functions:

- 03 (0x03) Read Holding Registers – output data readout.
- 04 (0x04) Read Input Registers – input data readout.
- 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 |
| Platform 2 mass | 8 | 2 | float |

| | | | |
|------------------------------|----|---|-------|
| Platform 2 tare | 10 | 2 | float |
| Platform 2 unit | 12 | 1 | word |
| Platform 2 status | 13 | 1 | word |
| Platform 2 LO threshold | 14 | 2 | float |
| Process status (Stop, Start) | 32 | 1 | word |
| Inputs status | 33 | 1 | word |
| Min | 34 | 2 | float |
| Max | 36 | 2 | float |
| Lot number | 42 | 2 | dword |
| Operator | 44 | 1 | word |
| Product | 45 | 1 | word |
| Customer | 46 | 1 | word |
| Packaging | 47 | 1 | word |
| Source warehouse | 48 | 1 | word |
| Target warehouse | 49 | 1 | word |
| Formulation/Dosing | 50 | 1 | word |

Platform mass – response: platform mass in current unit.

Platform tare – response: platform tare in an adjustment unit.

Platform unit – determines currently displayed mass unit of a platform.

| Unit bits | |
|-----------|---------------|
| 0 | gram [g] |
| 1 | kilogram [kg] |
| 2 | carat [ct] |
| 3 | pound [lb] |
| 4 | ounce [oz] |
| 5 | Newton [N] |

Example:

| bit No. | B5 | B4 | B3 | B2 | B1 | B0 |
|---------|----|----|----|----|----|----|
| value | 0 | 0 | 0 | 0 | 1 | 0 |

The unit of the weighing instrument is kilogram [kg].

Platform status – determines status of a weighing platform.

| Status bits | |
|-------------|---|
| 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 error, stable measurement in II weighing range.

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

Process status – determines process status:

| Decimal value | Process status | bit No. | |
|---------------|-------------------|---------|----|
| | | B1 | B0 |
| 0 | process disabled | 0 | 0 |
| 1 | process start | 0 | 1 |
| 2 | process stop | 1 | 0 |
| 3 | process completed | 1 | 1 |

Inputs status – response: status of set inputs:

| Input No. | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|-----------|----|----|----|---|---|---|---|---|---|---|---|---|
| OFF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ON | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

Example:

Mask of set 2 and 4 inputs: 0000 0000 0000 1010

MIN – response: **MIN** threshold value (in the current unit selected for active working mode).

MAX – response: **MAX** threshold value (in the current unit selected for active working mode).

Lot number – response: lot number.

Operator – response: code of logged in operator.

Product – response: code of selected product.

Customer – response: code of selected customer.

Packaging – response: code of selected packaging.

Source warehouse – response: code of selected source warehouse.

Target warehouse – response: code of selected target warehouse.

Formulation – response: code of selected formulation.

3.2. Output Address

Output variables list:

| Variable | Address | Length [word] | Data type |
|------------------------|---------|---------------|-----------|
| Command | 0 | 1 | word |
| Command with parameter | 1 | 1 | word |
| Platform | 2 | 1 | word |
| Tare | 3 | 2 | float |
| LO threshold | 5 | 2 | float |
| Outputs status | 7 | 1 | word |
| Min | 8 | 2 | float |
| Max | 10 | 2 | float |
| Lot number | 16 | 2 | dword |
| Operator | 18 | 1 | word |
| Product | 19 | 1 | word |
| Customer | 20 | 1 | word |
| Packaging | 21 | 1 | word |
| Source warehouse | 22 | 1 | word |
| Target warehouse | 23 | 1 | word |
| Formulation/Dosing | 24 | 1 | word |

Basic command – setting respective value performs the task in accordance with the table:


| Decimal value | Command |
|---------------|-------------------|
| 1 | Zero the platform |
| 2 | Tare the platform |
| 4 | Delete statistics |
| 8 | Save/Print |
| 16 | Start |
| 32 | Stop (error) |

Example:

0000 0000 0010 0000 – process start.

Complex command – setting respective value performs the task in accordance with the table:

| Decimal value | Command |
|---------------|---|
| 1 | Setting tare value for a given platform |
| 2 | Setting LO threshold value for a given platform |
| 3 | Setting lot number |
| 4 | Setting outputs status |
| 5 | Operator selection |
| 6 | Product selection |
| 7 | Packaging selection |
| 8 | Setting MIN threshold value |
| 9 | Customer selection |
| 10 | Source warehouse selection |
| 11 | Target warehouse selection |
| 12 | Dosing selection |
| 16 | Setting MAX threshold value |

| | |
|---|--|
|  | <p><i>Complex command requires setting address of respective parameter (from 2 to 24 – refer to: "Complex command parameters").</i></p> |
|---|--|

Example:

0000 0000 0000 0010 – command sets LO threshold to the value set in LO parameter (address 5 – refer to: "Complex command parameters").

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: determines status of weighing indicator outputs.

| Output No. | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|------------|----|----|----|---|---|---|---|---|---|---|---|---|
| OFF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ON | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

Example:

Mask of active 2 and 4 outputs: 0000 0000 0000 1010

MIN – complex command parameter: MIN threshold value (in the current unit selected for active working mode).

MAX – complex command parameter: MAX threshold value (in the current unit selected for active working mode).

Lot number – complex command parameter: lot number.

Operator – complex command parameter: code of logged in operator.

Product – complex command parameter: code of selected product.


Customer – complex command parameter: code of selected customer.

Packaging – complex command parameter: code of selected packaging.

Source warehouse – complex command parameter: code of selected source warehouse.

Target warehouse – complex command parameter: code of selected target warehouse.

Formulation – complex command parameter: code of selected formulation.

| | |
|---|--|
|  | <i>A command or a command with 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> |
|---|--|

Example:

| Command | address 1 | address 0 |
|-------------------|-----------|-----------|
| Tare | 0000 0000 | 0000 0010 |
| Zero command bits | 0000 0000 | 0000 0000 |
| Tare | 0000 0000 | 0000 0010 |



RADWAG WAGI ELEKTRONICZNE
ZAAWANSOWANE TECHNOLOGIE WAGOWE

