

PROFIBUS

Communication Protocol of PUE HY10 Indicator

SOFTWARE MANUAL

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RADWAG® RADWAG BALANCES AND SCALES
ADVANCED WEIGHING TECHNOLOGIES

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1. GENERAL INFORMATION

Profibus Communication Module ensures data exchange between a supervising controlling device (master) and a scale (Slave) in accordance with the Profibus DP protocol.

The supervising unit enables:

- Cyclic reading in input signals from an indicator PUE HY10 series,
- Cyclic saving outputs status to an indicator PUE HY10 series.

Profibus communication functionality with the indicator PUE HY10 enables:

- Operation of four weighing platforms,
- Tarring,
- Zeroing,
- Setting tare value,
- Setting the value of LO limit,
- Setting the value of Min threshold,
- Setting the value of Max threshold,
- Reading inputs status,
- Setting outputs,
- Selecting an operator,
- Selecting a product,
- Selecting a client,
- Selecting a packaging,
- Selecting a source warehouse,
- Selecting a destination warehouse,
- Selecting a formulation,
- Setting lot number,
- Process stopping,
- Process starting,
- Saving / Printing,
- Statistics zeroing.

2. MEMORY MAP

2.1. Output address

| Address Offset | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|-------------------|------|------|------|------|------|------|------|------|------|------|
| 0 | M 1 | M 1 | M 1 | M 1 | T 1 | T 1 | T 1 | T 1 | J 1 | J 1 |
| 1 | S 1 | S 1 | LO 1 | LO 1 | LO 1 | LO1 | M 2 | M 2 | M 2 | M 2 |
| 2 | T 2 | T 2 | T 2 | T 2 | J 2 | J 2 | S 2 | S 2 | LO 2 | LO 2 |
| 3 | LO 2 | LO 2 | M 3 | M 3 | M 3 | M 3 | T 3 | T 3 | T 3 | T 3 |
| 4 | J 3 | J 3 | S 3 | S 3 | LO 3 | LO 3 | LO 3 | LO 3 | M 4 | M 4 |
| 5 | M 4 | M4 | T 4 | T 4 | T 4 | T 4 | J 4 | J 4 | S 4 | S 4 |
| 6 | LO 4 | LO 4 | LO 4 | LO 4 | ST | ST | SW | SW | MIN | MIN |
| 7 | MIN | MIN | MAX | MAX | MAX | MAX | - | - | - | - |
| 8 | - | - | - | - | LOT | LOT | LOT | LOT | O | O |
| 9 | A | A | K | K | OK | OK | MZ | MZ | MD | MD |
| 10 | RC | RC | - | - | - | - | - | - | - | - |

Where:

| | |
|------------|--|
| M | Mass of a weighing platform, 4 bytes, float |
| T | Tare of a weighing platform, 4 bytes, float |
| J | Measuring unit of a weighing platform, 2 bytes, word |
| S | Status of a weighing platform, 2 bytes, word |
| LO | Lo limit of a weighing platform, 4 bytes, float |
| MIN | MIN threshold, 4 bytes, float |
| MAX | MAX threshold, 4 bytes, float |
| LOT | Lot, 4 bytes, word |
| O | Operator, 2 bytes, word |
| A | Product, 2 bytes, word |
| K | Client, 2 bytes, word |
| OK | Packages, 2 bytes, word |
| MZ | Source warehouse, 2 bytes, word |
| MD | Destination warehouse, 2 bytes, word |
| RC | Formulation, 2 bytes, word |

2.2. 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 | SW | SW | MIN | MIN | MIN | MIN |
| 2 | MAX | MAX | MAX | MAX | - | - | - | - | - | - |
| 3 | - | - | LOT | LOT | LOT | LOT | O | O | A | A |
| 4 | K | K | OK | OK | MZ | MZ | MD | MD | RC | RC |

Where:

| | |
|------------|---|
| C | Command, 2 bytes, word |
| CP | Command with a parameter, 2 bytes, word |
| P | Active weighing platform, 2 bytes, word |
| T | Tare of a weighing platform, 4 bytes, float |
| LO | Lo limit of a weighing platform, 4 bytes, float |
| SW | Inputs/Outputs statuses, 2 bytes, word |
| MIN | MIN threshold, 4 bytes, float |
| MAX | MAX threshold, 4 bytes, float |
| LOT | Lot, 4 bytes, word |
| O | Operator, 2 bytes, word |
| A | Product, 2 bytes, word |
| K | Client, 2 bytes, word |
| OK | Packages, 2 bytes, word |
| MZ | Source warehouse, 2 bytes, word |
| MD | Destination warehouse, 2 bytes, word |
| RC | Formulation, 2 bytes, word |

3. DESCRIPTION OF VARIABLES

3.1. Output variables

Reading the output variables enables obtaining data on device status.

List of output variables:

| Variable | Address | Length [word] | Data type |
|------------------------------|---------|---------------|-----------|
| Mass of platform 1 | 0 | 2 | float |
| Tare of platform 1 | 4 | 2 | float |
| Measuring unit of platform 1 | 8 | 1 | word |
| Status of platform 1 | 10 | 1 | word |
| Lo limit of platform 1 | 12 | 2 | float |
| Mass of platform 2 | 16 | 2 | float |
| Tare of platform 2 | 20 | 2 | float |
| Measuring unit of platform 2 | 24 | 1 | word |
| Status of platform 2 | 26 | 1 | word |
| Lo limit of platform 2 | 28 | 2 | float |
| Mass of platform 3 | 32 | 2 | float |
| Tare of platform 3 | 36 | 2 | float |
| Measuring unit of platform 3 | 40 | 1 | word |
| Status of platform 3 | 42 | 1 | word |
| Lo limit of platform 3 | 44 | 2 | float |
| Mass of platform 4 | 48 | 2 | float |
| Tare of platform 4 | 52 | 2 | float |
| Measuring unit of platform 4 | 56 | 1 | word |
| Status of platform 4 | 58 | 1 | word |
| Lo limit of platform 4 | 60 | 2 | float |
| Process status (Stop, Start) | 64 | 1 | word |
| Inputs status | 66 | 1 | word |
| Min | 68 | 2 | float |
| Max | 72 | 2 | float |
| Lot number | 84 | 2 | word |
| Operator | 88 | 1 | word |
| Product | 90 | 1 | word |
| Client | 92 | 1 | word |
| Packaging | 94 | 1 | word |
| Source warehouse | 96 | 1 | word |
| Destination warehouse | 98 | 1 | word |
| Formulation | 100 | 1 | word |

Mass of platform – response is mass on a weighing platform in current measuring unit.

Tare of platform – response is the value of tare on a weighing platform in adjustment unit.

Measuring unit of a platform – determines current (displayed) measuring unit set for a weighing platform.

| Measuring 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 scale measures with a unit: kilogram [kg].

Status of a platform – determines status of a weighing platform

| Bity statusu | |
|---------------------|--|
| 0 | correct measurement (the scale does not report an error) |
| 1 | stable measurement |
| 2 | scale in precise zero |
| 3 | scale tarred |
| 4 | scale in 2nd measuring range |
| 5 | scale in 3rd measuring range |
| 6 | scale reports NULL error |
| 7 | scale reports LH error |
| 8 | scale 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 scale does not report an error, the measurement is stabilized in the 2nd measuring range.

LO – response is the value of **LO** limit in an adjustment unit of a given weighing platform.

Process status – determines status of a process:

| Decimal value of a variable | Process status | Bit no. | |
|-----------------------------|------------------|---------|----|
| | | B1 | B0 |
| 0 | Process inactive | 0 | 0 |
| 1 | Process start | 0 | 1 |
| 2 | Process stop | 1 | 0 |
| 3 | Process end | 1 | 1 |

Inputs status – response is the 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 inputs 2 and 4: 0000 0000 0000 1010

MIN – response is the value of set **MIN** threshold (in a measuring unit of an enabled working mode).

MAX - response is the value of set **MAX** threshold (in a measuring unit of an enabled working mode).

Lot number – response is the value of lot number.

Operator – response is the value of a logged operator.

Product – response is the value of a selected product.

Client – response is the value of a code of a selected client.

Packaging – response is the value of a code of a selected packaging.

Source warehouse – response is the value of a code of a source warehouse.

Destination warehouse – response is the value of a code of a destination warehouse.

Formulation – response is the value of a code of a selected formulation.

3.2. Input variables

Saving input variables in an indicator PUE HY10 series enables influencing its operation.

List of input variables:

| Variable | Address | Length [word] | Data type |
|--------------------------|---------|---------------|-----------|
| Command | 0 | 1 | word |
| Command with a parameter | 2 | 1 | word |

List of parameters of a complex command:

| Parameter | Address | Length [word] | Data type |
|-----------------------|---------|---------------|-----------|
| Platform | 4 | 1 | word |
| Tare | 6 | 2 | float |
| LO limit | 10 | 2 | float |
| Output status | 14 | 1 | word |
| Min | 16 | 2 | float |
| Max | 20 | 2 | float |
| Lot number | 32 | 2 | word |
| Operator | 36 | 1 | word |
| Product | 38 | 1 | word |
| Client | 40 | 1 | word |
| Packaging | 42 | 1 | word |
| Source warehouse | 44 | 1 | word |
| Destination warehouse | 46 | 1 | word |
| Formulation | 48 | 1 | word |

basic command – Setting a bit causes carrying out a task as specified in a below table:


| Command bit | Command |
|-------------|------------------|
| 0 | Zero platform |
| 1 | Tare platform |
| 3 | Clear statistics |
| 4 | Save / Print |
| 5 | Start |
| 6 | Stop |

Example:

0000 0000 0010 0000 – the command carries out process start.

complex command - Setting a bit causes carrying out a task as specified in a below table:

| Command bit | Command |
|-------------|--|
| 0 | Setting tare value of a weighing platform |
| 1 | Setting the value of LO limit of a weighing platform |
| 2 | Setting outputs status |
| 3 | Setting the value of MIN threshold |
| 4 | Setting the value of MAX threshold |

| | |
|---|--|
|  | <i>A complex command requires setting an appropriate parameter (addresses from 4 to 48. – see table “List of parameters in a complex command”).</i> |
|---|--|

Example:

0000 0000 0000 0010 – a command carries out setting of the LO limit for a value given in parameter LO (address 10 – see table “List of parameters in a complex command”).

Platform – complex command parameter: number of a weighing platform.

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

LO – complex command parameter: the value of LO limit (in an adjustment unit).

Outputs status – complex command parameter: determines outputs status of an indicator.

| 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 outputs 2 and 4: 0000 0000 0000 1010

MIN - complex command parameter: the value of MIN threshold (in a measuring unit of an enabled working mode).

MAX - complex command parameter: the value of MAX threshold (in a measuring unit of an enabled working mode).

Lot number - complex command parameter: the value of lot number.

Operator - complex command parameter: the value of a code of a logged operator.

Product - complex command parameter: the value of a code of a selected product.


Client - complex command parameter: the value of a code of a selected client.

Packaging - complex command parameter: the value of a code of a selected packaging.

Source warehouse - complex command parameter: the value of a code of a selected source warehouse.

Destination warehouse - complex command parameter: the value of a code of a selected destination warehouse.

Formulation - complex command parameter: response is the value of a code of a selected formulation.

| | |
|--|---|
|  | <p><i>A command or a command with a parameter is carried out once on detecting the setting of a corresponding bit. If it is necessary to repeat a command with the same bit, then first it has to be zeroed.</i></p> |
|--|---|

Example:

| Command | address 1 | address 0 |
|----------------------|------------------|------------------|
| Tarring | 0000 0000 | 0000 0010 |
| Zeroing command bits | 0000 0000 | 0000 0000 |
| Tarring | 0000 0000 | 0000 0010 |



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