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Software manual

ITKP-52-02-03-24-EN

MODBUS TCP

COMMUNICATION PROTOCOL:
PUE CY10 Terminal
CY10 Scales
5Y Scales

MARCH 2024

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1. GENERAL INFORMATION

Modbus TCP protocol implemented in the scale can be applied when Ethernet are used.

2. MASS CONVERTER SETTINGS AND CONFIGURATION

To set the scale communication via Modbus TCP protocol go to **<SETUP / Peripherals / Modbus TCP>**. For detailed description of settings configuration read **„PUE CY10 - Software manual"** user manual.

3. IMPLEMENTED FUNCTIONS

Modbus communication is based on 4 functions:

- 03 (0x03) Read Holding Registers – reading holding register.
- 04 (0x04) Read Input Registers – reading input register.
- 06 (0x06) Write Single Register – writing single holding register.
- 16 (0x10) Write Multiple Registers – writing multiple holding registers

4. DATA STRUCTURE

All registers are 2-byte type (WORD). Floating point data (such as mass and tare) are stored in 2 consecutive registers and are FLOAT-type data. If the first register consists of 2 AB bytes and the other of 2 CD bytes, then FLOAT value is HEX ABCD. e.g. if R30001 register has the value of 0x3EB6 and R30002 register has the value of 0x45A2, then after conversion to 0X3EB645A2 float the result is 0.356. Other registers must be read as HEX values.

5. MEMORY MAP

5.1. INPUT Registers (Read-Only)

Register	Offset	Modbus address	Length [WORD]	Data type
Platform 1 mass	0	30001	2	float
Platform 1 tare	2	30003	2	float
Platform 1 unit	4	30005	1	word
Platform 1 status	5	30006	1	word
Platform 1 LO threshold	6	30007	2	float
Platform 2 mass	8	30009	2	float
Platform 2 tare	10	30011	2	float
Platform 2 unit	12	30013	1	word
Platform 2 status	13	30014	1	word
Platform 2 LO threshold	14	30015	2	float
Platform 3 mass	16	30017	2	float
Platform 3 tare	18	30019	2	float
Platform 3 unit	20	30021	1	word
Platform 3 status	21	30022	1	word
Platform 3 LO threshold	22	30023	2	float
Platform 4 mass	24	30025	2	float
Platform 4 tare	26	30027	2	float
Platform 4 unit	28	30029	1	word
Platform 4 status	29	30030	1	word
Platform 4 LO threshold	30	30031	2	float
Platform 1 min	34	30035	2	float
Platform 1 max	36	30037	2	float
Platform 2 min	58	30059	2	float
Platform 2 max	60	30061	2	float
Platform 3 min	66	30067	2	float
Platform 3 max	68	30069	2	float
Platform 4 min	74	30075	2	float
Platform 4 max	76	30077	2	float

5.2. INPUT Registers

Mass – response: mass value of a given platform in current unit.

Tare – response: tare value of a given platform in adjustment unit.

Unit – determines currently displayed mass unit of a given platform.

Bit No.	Unit
0	gram [g]
1	kilogram [kg]
2	carat [ct]
3	pound [lb]
4	ounce [oz]
5	Newton [N]

Example:

Read HEX value: 0x02. Binary form:

B1/7	B1/6	B1/5	B1/4	B1/3	B1/2	B1/1	B1/0	B0/7	B0/6	B0/5	B0/4	B0/3	B0/2	B0/1	B0/0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0

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

Platform status – determines weighing instrument status:

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.
6	Weighing instrument reports NULL error.
7	Weighing instrument reports LH error.
8	Weighing instrument reports FULL error.

Example:

Read HEX value: 0x13

B1/7	B1/6	B1/5	B1/4	B1/3	B1/2	B1/1	B1/0	B0/7	B0/6	B0/5	B0/4	B0/3	B0/2	B0/1	B0/0
0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1

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

LO threshold - response: **LO** threshold value in adjustment unit.

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).

5.3. HOLDING Registers (Read/Write)

Variable	Offset	Modbus address	Length [WORD]	Data type
Command	500	40501	1	word
Command with parameter	501	40502	1	word
Platform	502	40503	1	word
Tare	503	40504	2	float
LO threshold	505	40506	2	float
Min	508	40509	2	float
Max	510	40511	2	float

5.4. HOLDING Registers

Basic command – writing the register with respective value triggers the following actions:

Bit No.	Operation
0	Zero the platform. Zero the platform number selected in register 40503. When register 40503 is zero, the active platform is zeroed.
1	Tare the platform. Tares the platform number selected in register 40503. When register 40503 is zero, the active platform is tared.
4	Save/Print. Saves the measurement for the active scale platform (no matter to the set platform number in the register 40503).



Do not set more than 1 bit in the register.

Example:

Writing the register with value 0x02

B1/7	B1/6	B1/5	B1/4	B1/3	B1/2	B1/1	B1/0	B0/7	B0/6	B0/5	B0/4	B0/3	B0/2	B0/1	B0/0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0

This will tare the scale of the active/selected scale platform.

	***A command is executed once upon detecting that its bit has been set. If the command is to be executed more than once, it is necessary to zero the bit first, and reset it to the required value next.***

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

Bit No.	Operation
0	Setting tare value for a given platform.
1	Setting LO threshold value.
3	Setting MIN threshold value.
4	Setting MAX threshold value.

	***Complex command requires setting address of respective parameter (from 40503 to 40511 – refer to: HOLDING table).***
	***A command with a parameter is executed once when its bit setting is detected. If the command is to be executed more than once, it is necessary to zero the bit first, and reset it to the required value next.***
	***Do not set more than 1 bit in the register.***

Example:

Sending a tare value of 1.0 for the 1st platform to the scale.

Executing the command requires writing 3 holding registers:
40502 – command with parameter - value 0x01 - which is tare setting.
40503 – number of the weighing platform to which we want to assign the tare - value 0x01 for the first platform.
40504 – tare value in float format - 1.0.

Platform – complex command parameter: weighing platform number (1-4).

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

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

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).