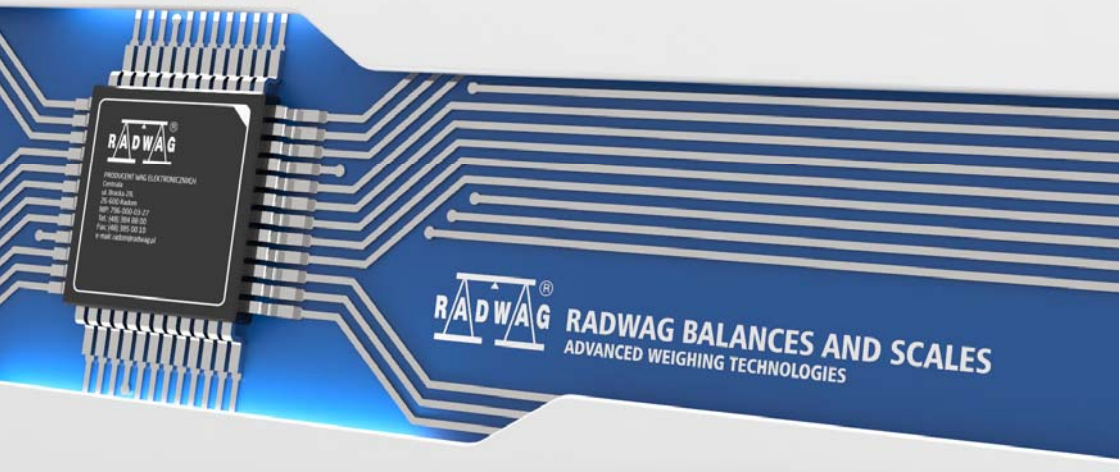
PROFIBUS

Communication Protocol of PUE HX5.EX Indicator

SOFTWARE MANUAL

ITKP-03-02-08-19-EN



AUGUST 2019

"The drawings, photos and graphics used are for illustrative purposes only."

CONTENTS

1. DATA STRUCTURE

1.1. Input Address

Input variables list:

Variable	Offset	Length [WORD]	Data type
Mass	0	2	float
Tare	4	2	float
Unit	8	1	word
Platform status	10	1	word
LO threshold	12	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	dword
Operator	88	1	word
Product	90	1	word
Customer	92	1	word
Packaging	94	1	word
Source warehouse	-	-	-
Target warehouse	-	-	-
Formulation/Dosing	100	1	word

Platform mass – response: platform mass in current unit.

Platform tare – response: platform tare in 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	- stable measurement
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 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.

1.2. Output Address

Input variables list:

Variable	Offset	Length [WORD]	Data type
Command	0	1	word
Command with parameter	2	1	word
Platform	4	1	word
Tare	6	2	float
LO threshold	10	2	float
Outputs status	14	1	word
Min	16	2	float
Max	20	2	float
Lot number	32	2	dword
Operator	36	1	word
Product	38	1	word
Customer	40	1	word
Packaging	42	1	word
Source warehouse	-	-	-
Target warehouse	-	-	-
Formulation/Dosing	48	1	word

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

Bit No.	Command
0	Zero the platform
1	Tare the platform
2	Delete statistics
3	Save/Print
4	Start
5	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
0	Setting the tare value for a given platform
1	Setting LO threshold value for a given platform
2	Setting lot number
3	Setting outputs status
4	Operator selection
5	Product selection
6	Packaging selection
7	Setting MIN threshold value
8	Customer selection
9	Source warehouse selection
10	Target warehouse selection
11	Dosing selection
12	Setting MAX threshold value

Complex command requires setting address of respective parameter (from 2 to 24 – refer to: 'Complex command parameters' table).

Example:

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

Platform – complex command parameter: weighing platform number.

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

LO threshold – complex command parameter: LO threshold value (in 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.

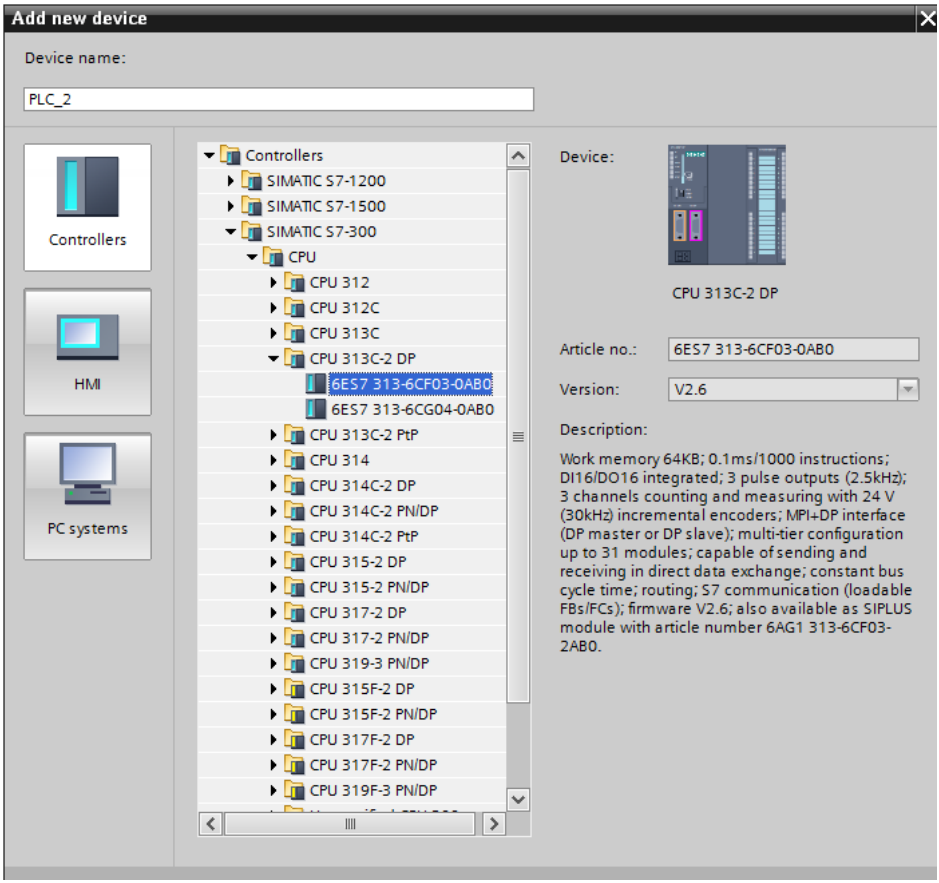
A command or a command with parameter is executed once when its bit setting is detected. If the command with the same bit is to be executed again, zero the bit.

Example:

Command	
Taring	0000 0000 0000 0010
Command bits zeroing	0000 0000 0000 0000
Taring	0000 0000 0000 0010

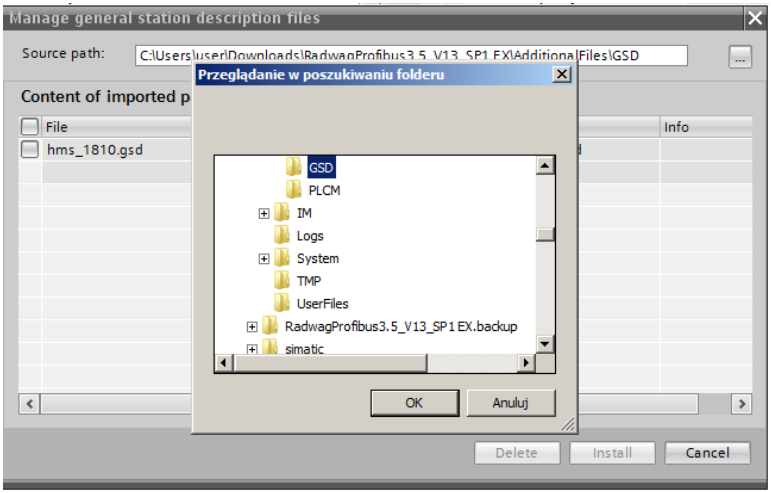
2. CONFIGURATION OF PROFIBUS MODULE IN TIA PORTAL V13

Operating the environment has to be preceded with creating a new project in which the topology of the PROFIBUS network with MASTER PLC is determined (in this example: SIEMENS S7-300).

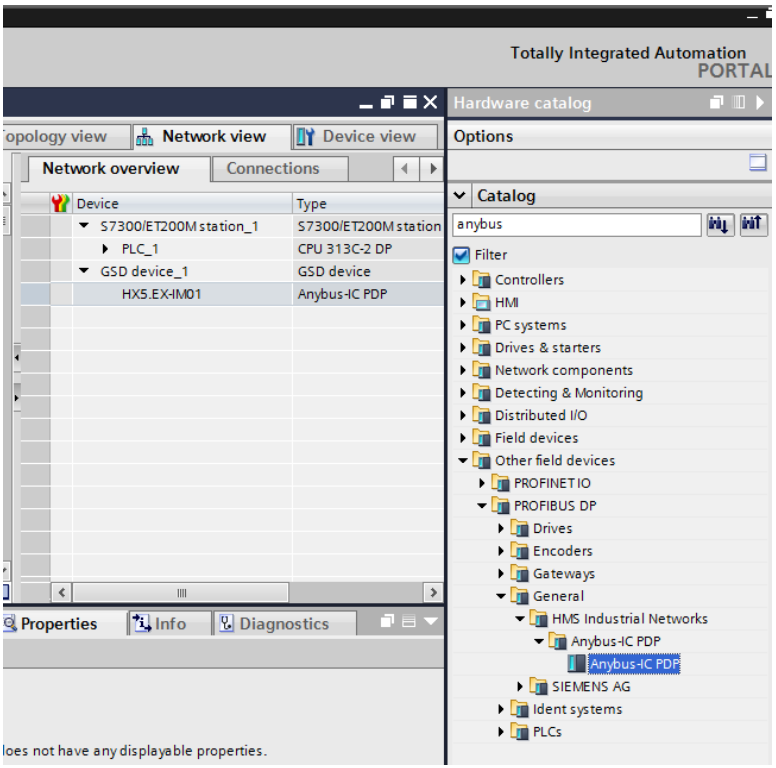


2.1. GSD Import

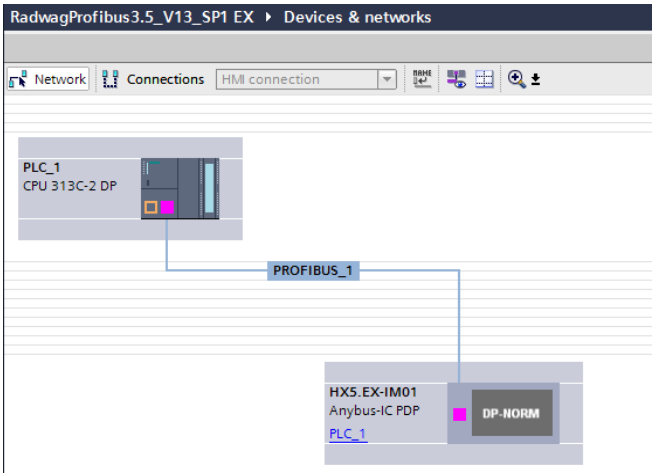
Using the included GSD configuration file add new device to the environment. Use OPTIONS tab first, MANAGE GENERAL STATION DESCRIPTION FILES (GSD) next and indicate the path to GSD file.



Upon successful adding of the file using list of devices, find Anybus-IC PDP module:

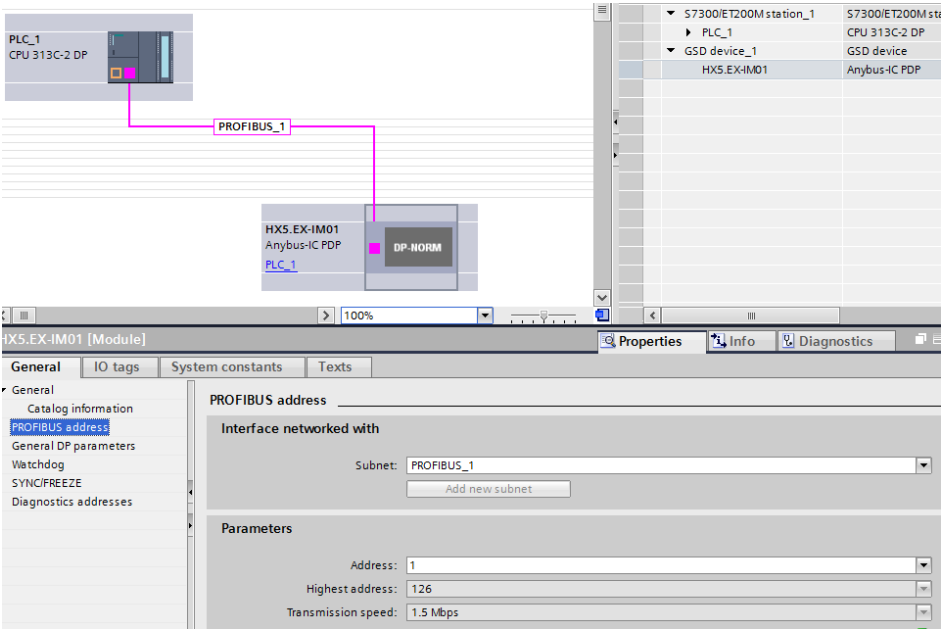


Create a network consisting of one MASTER PLC and added SLAVE module:

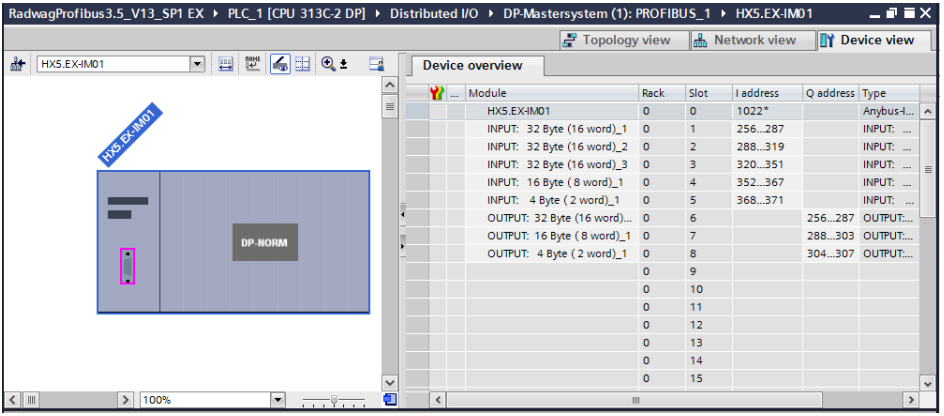


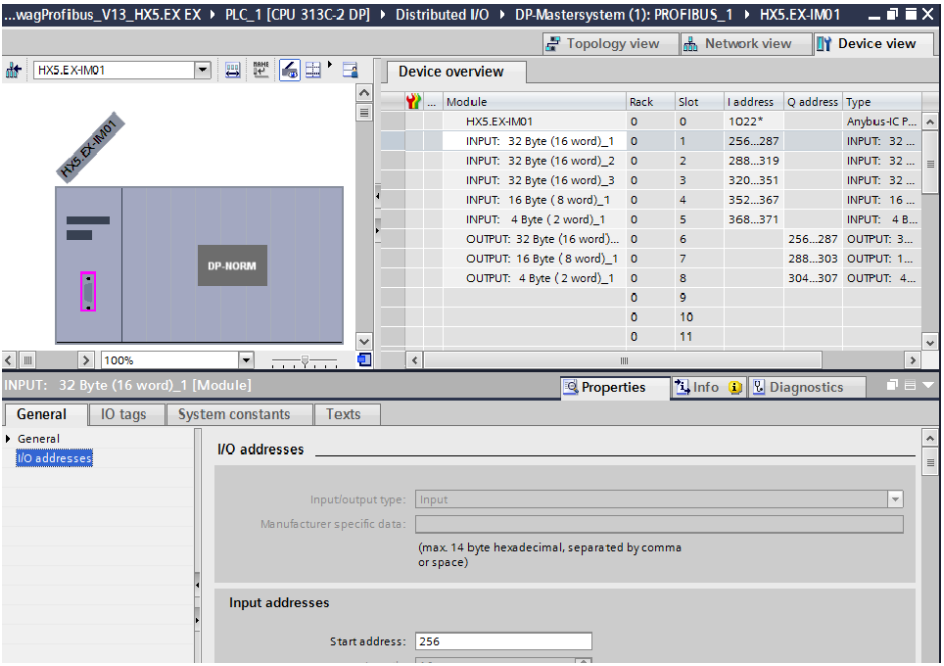
2.2. Module Configuration

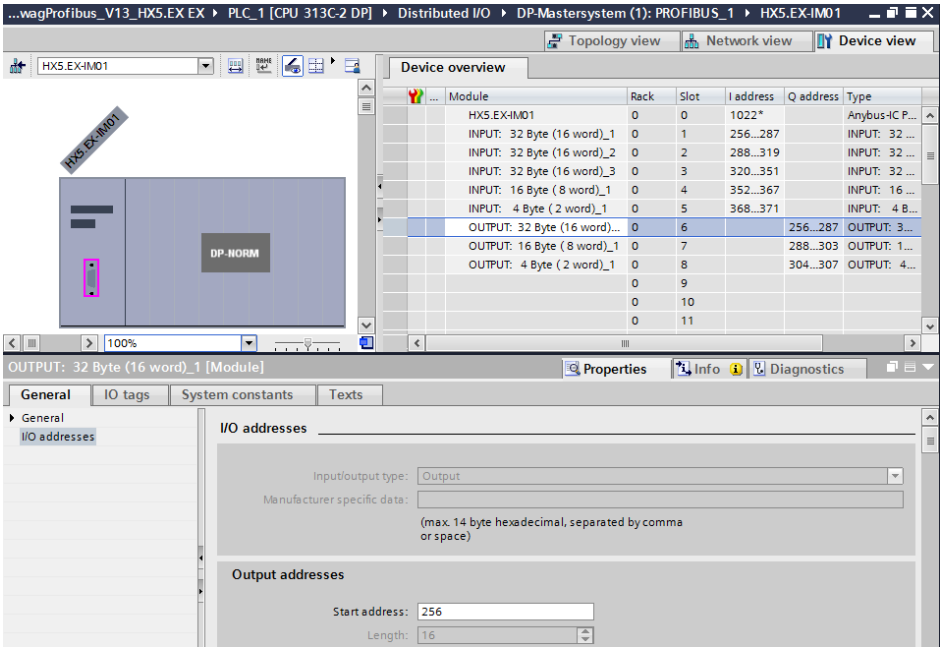
Next, specify the address of the module. It has to be the same as the one set in the weighing instrument menu.



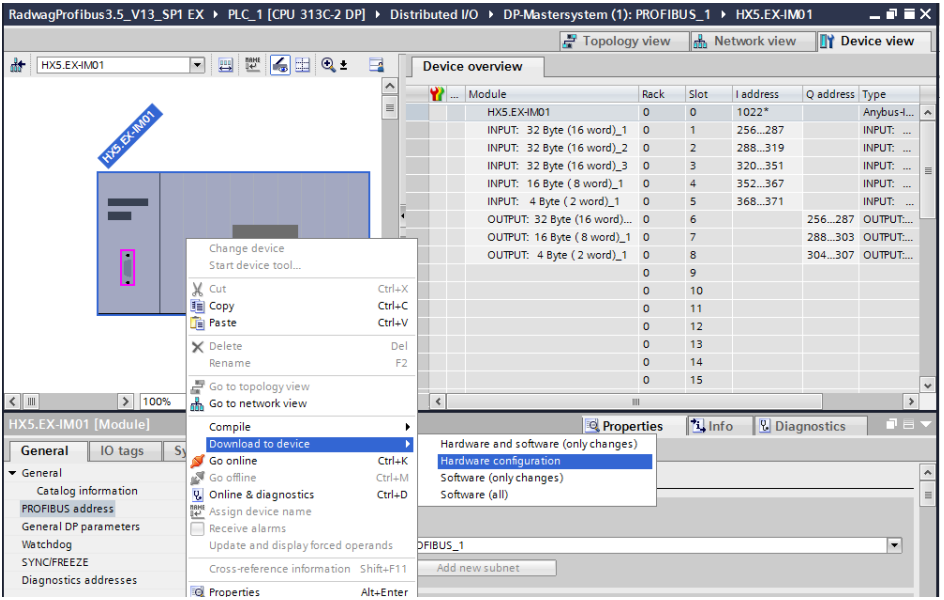
Proceed to module configuration. Start by determining the size and the starting address of input and output registers. To do this, select modules from the list of INPUT and OUTPUT modules as in the picture below. The maximum size of the input and output data is 116 bytes each. Default starting addresses were used in the project – 256 for INPUT module and 256 for OUTPUT module:







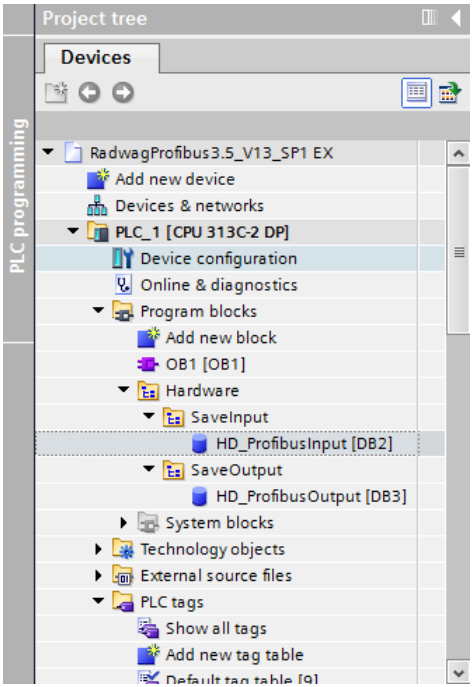
On this stage you can download hardware and software configuration to the device.



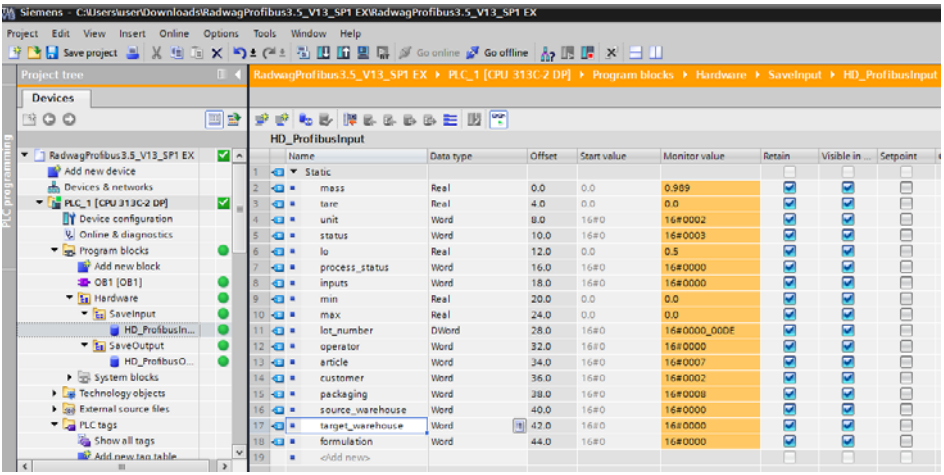
Upon successful compilation and loading of the code, MASTER and SLAVE modules should establish communication. The next step will be to create program code.

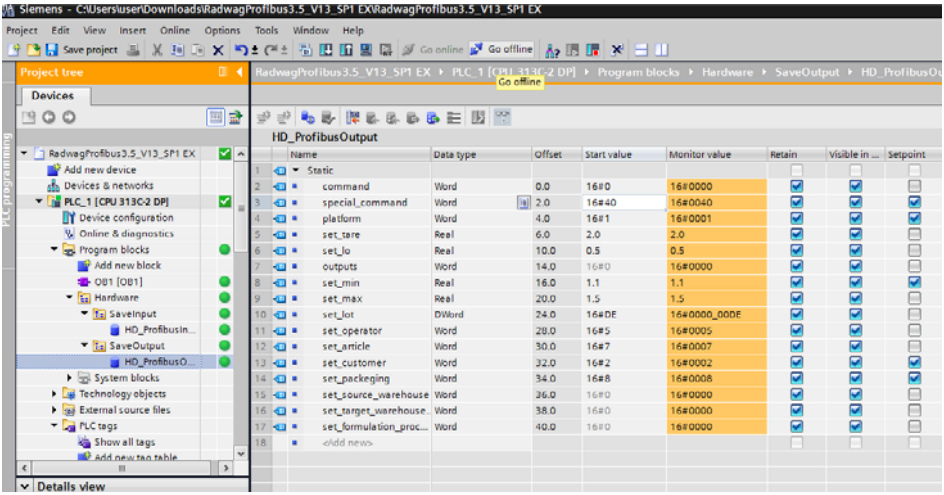
3. PLC SOFTWARE SAMPLE

Start creating the application by determining symbolic names of input and output registers. The PROFINET module input and output registers are specified in HD_ProfibusInput and HD_ProfibusOutput tables in HARDWARE group in PROGRAM BLOCKS branch.

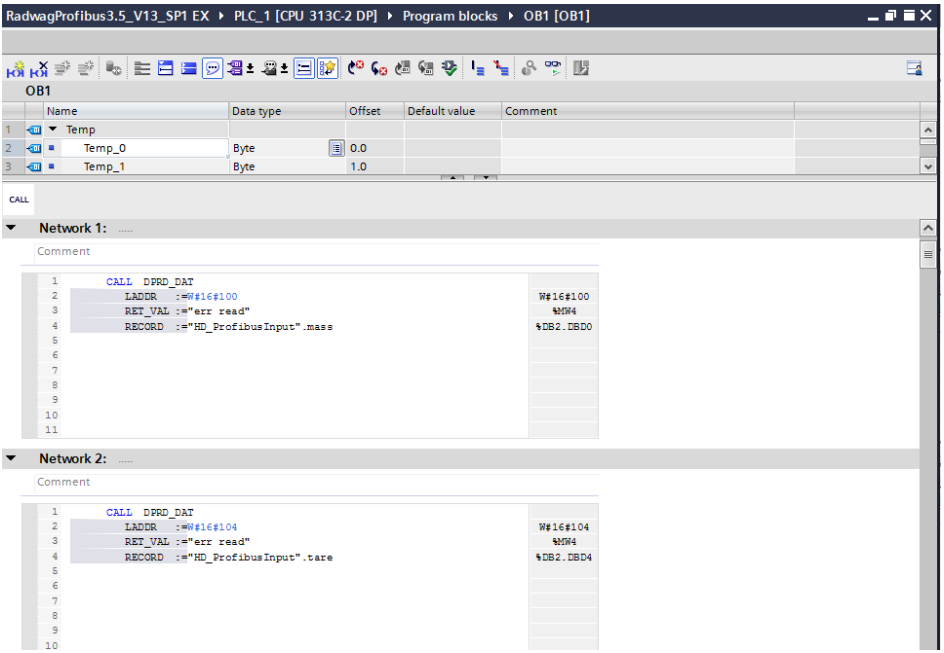


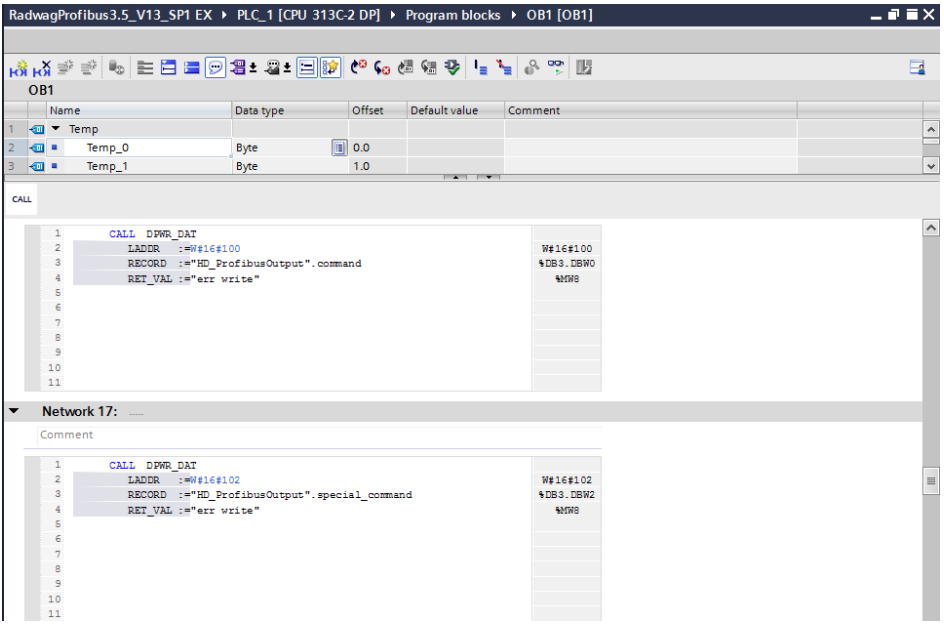
HD_ProfinetOutput and HD_ProfinetInput refer to the PROFIBUS module input/output registers on a weighing instrument. They look as follows:





In the main loop of the program create functions that rewrite the physical state of the weighing instrument registers into HD_ProfibusInput and HD_ProfibusOutput blocks registers. The functions may look as in the pictures presented below. The example shows the method of mass readout and saving 'command' and 'command with parameter' registers.


RadwagProfibus3.5_V13_SP1 EX ▸ PLC_1 [CPU 313C-2 DP] ▸ Program blocks ▸ OB1 [OB1]
OB1
Name
Data type
Offset
Default value
Comment
Temp
Temp_0
Byte
0.0
Temp_1
Byte
1.0
CALL
Network 1:
Comment
CALL DPRD_DAT
LADDR :=W#16#100
RET_VAL :="err read"
RECORD :="HD_ProfibusInput".mass
W#16#100
%MW4
%DB2.DBD0
Network 2:
Comment
CALL DPRD_DAT
LADDR :=W#16#104
RET_VAL :="err read"
RECORD :="HD_ProfibusInput".tare
W#16#104
%MW4
%DB2.DBD4


RadwagProfibus3.5_V13_SP1 EX ▸ PLC_1 [CPU 313C-2 DP] ▸ Program blocks ▸ OB1 [OB1]
OB1
Name
Data type
Offset
Default value
Comment
Temp
Temp_0
Byte
0.0
Temp_1
Byte
1.0
CALL
CALL DPWR_DAT
LADDR :=W#16#100
RECORD :="HD_ProfibusOutput".command
RET_VAL :="err write"
W#16#100
%DB3.DBW0
%MW8
Network 17:
Comment
CALL DPWR_DAT
LADDR :=W#16#102
RECORD :="HD_ProfibusOutput".special_command
RET_VAL :="err write"
W#16#102
%DB3.DBW2
%MW8

Upon compiling and loading the program to the device in the data block, you can read interesting output registers (MONITOR ALL) and save output registers (e.g. by changing START VALUE and LOAD START VALUES AS ACTUAL) of the SLAVE mode.

RADWAG BALANCES AND SCALES
ADVANCED WEIGHING TECHNOLOGIES