AG03/1

Siemens S7-300®
PROFIBUS® Interface Module
for TIA Portal® V14 SP1

Software Description

V1.0.0
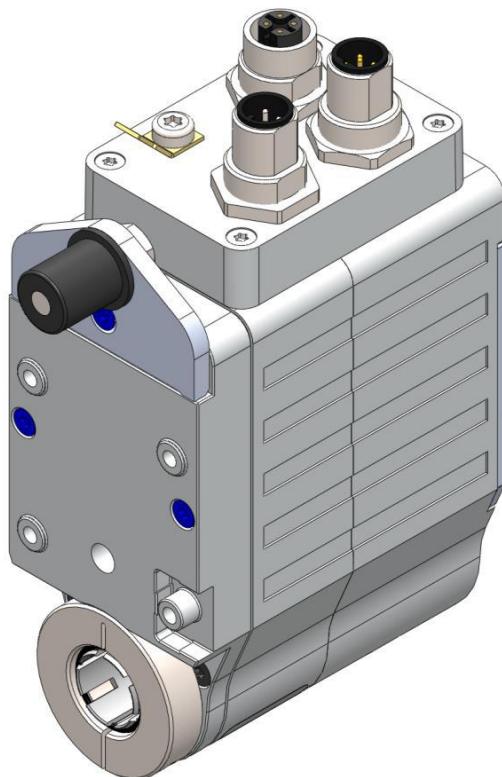
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1 General Notes

1.1 Trademarks

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1.3 Limitations

The library and its function were tested with SIMATIC® S7-300 CPU 314C-2 PN/DP.

The interface module was engineered in STL using Siemens TIA Portal® V14 SP1.

1.4 Requirements

- Basic knowledge of handling and programming Siemens systems.
- Familiarity with PROFIBUS® IO.

1.5   Versions Overview

This manual is related to

- AG03/1 firmware version >= 1.03
- Library "SIKO_AGXXvFPB_TIA_V14_SP1_S7300_LIB_V100"
- Function block FB213 "SIKO_DRV_AG03_1vPB"

1.6   List of Abbreviations

PB	PROFIBUS®	FB	Function Block
SW	Status Word	DB	Data Block
CW	Control Word		

Table 1: Abbreviations

1.7   Setup of PLC and PROFIBUS®

1.7.1   Create New TIA Portal® Project

1. Execute the command "Create new project".
2. Enter the project name "SIKO_example_S7300".
3. Choose a project path.
4. Execute the command "Create".
5. Change to "Project view".
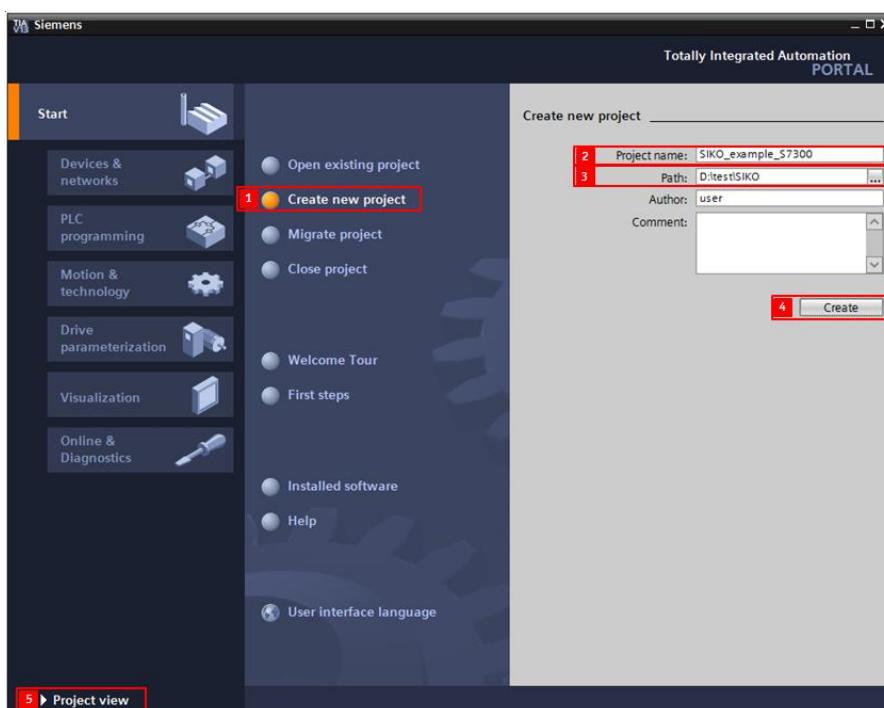
Abb. 1: TIA New Project

1.7.2   Add Your PLC to the Project

1. Navigate to the project tree in the project view and double-click on "Add new device".
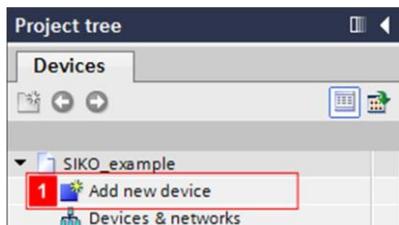
Abb. 2: Add New Device

2. Assign a device name, for example "PLC_1".

3. Select "Controllers" > "SIMATIC S7-300" > "CPU" > "CPU 314C-2 PN/DP" > "6ES7 314-6EH040AB0".

4. Select "Open device view".

5. Confirm with "OK".
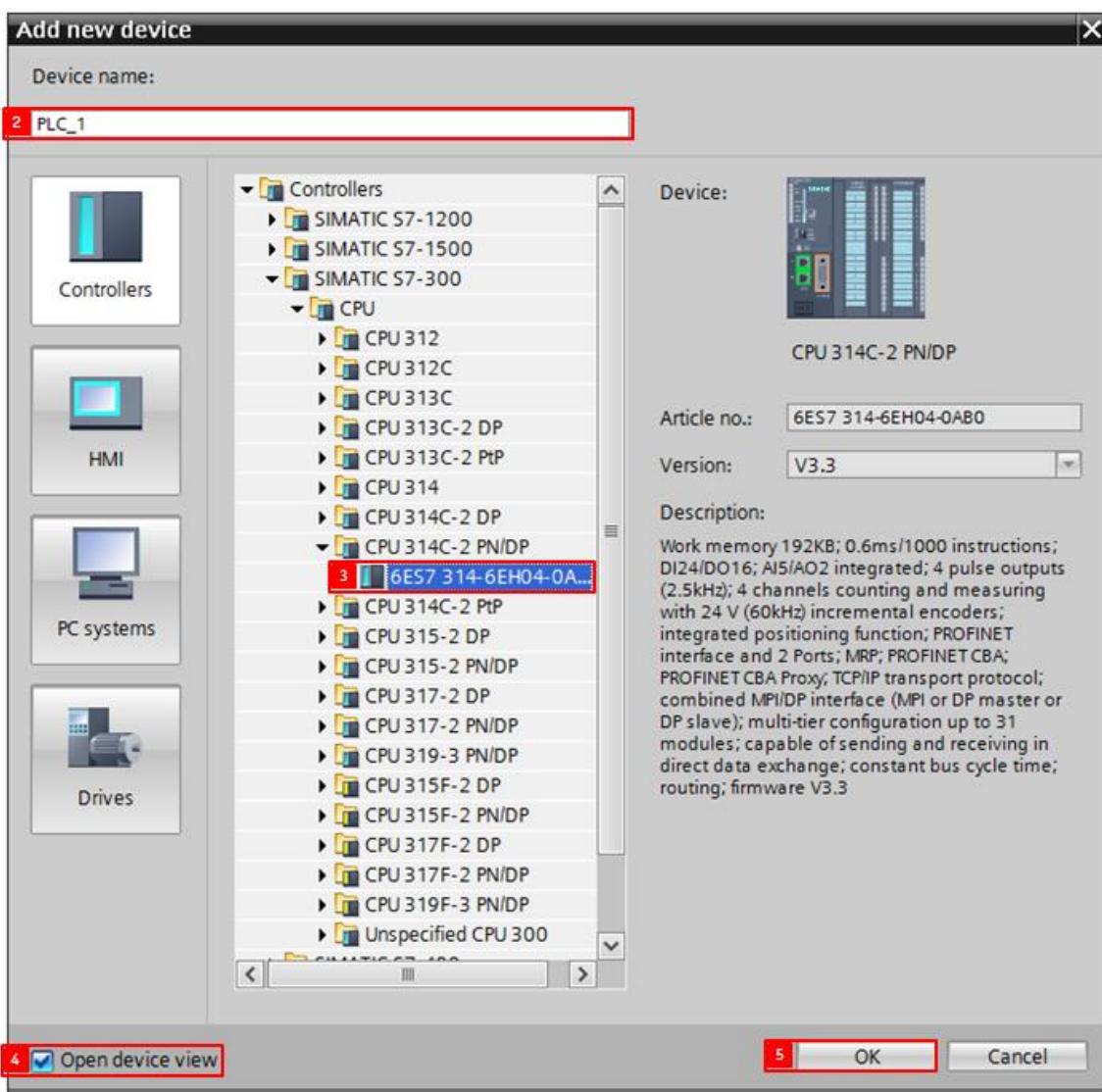
Abb. 3: Select PLC

1.7.3 Register the GSD Device Description File for AG03/1

1. Go to the TIA Portal® "Project view".
2. Execute the command: "Options" > "Manage general station description files (GSD)".
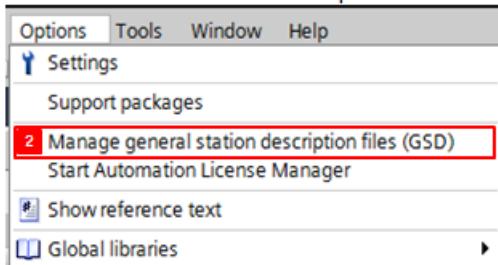
Abb. 4: Open GSD Files

3. Browse to the storage location of the GSD file.
4. Select the GSD file for Anybus Communicator.
5. Execute the command "Install".
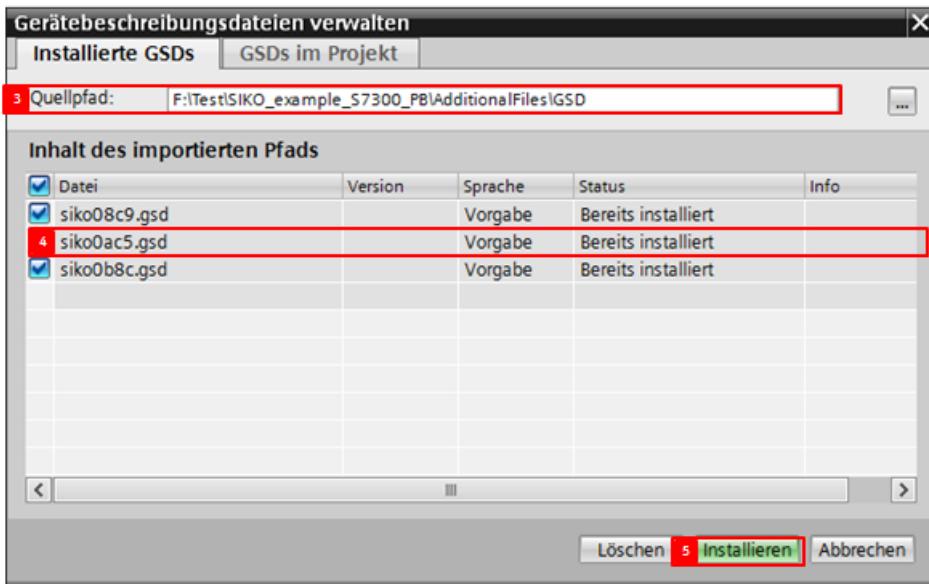
Abb. 5: Install GSD File

1.7.4 Add New Module to Your Hardware Configuration

1. Go to the TIA Portal® "Project view".

2. Double-click on "Device configuration" of your PLC.
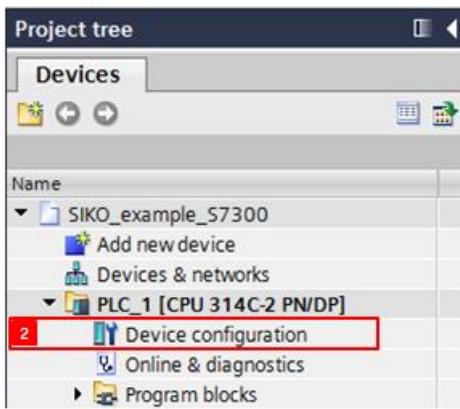
Abb. 6: Device Configuration

3. Navigate to the tab "Network view".

4. Add "RT Standard" from device "Anybus Cmunicator PN IO > Headmodules" of the hardware catalog to the "Devices & networks window". Please check corresponding GSD version!
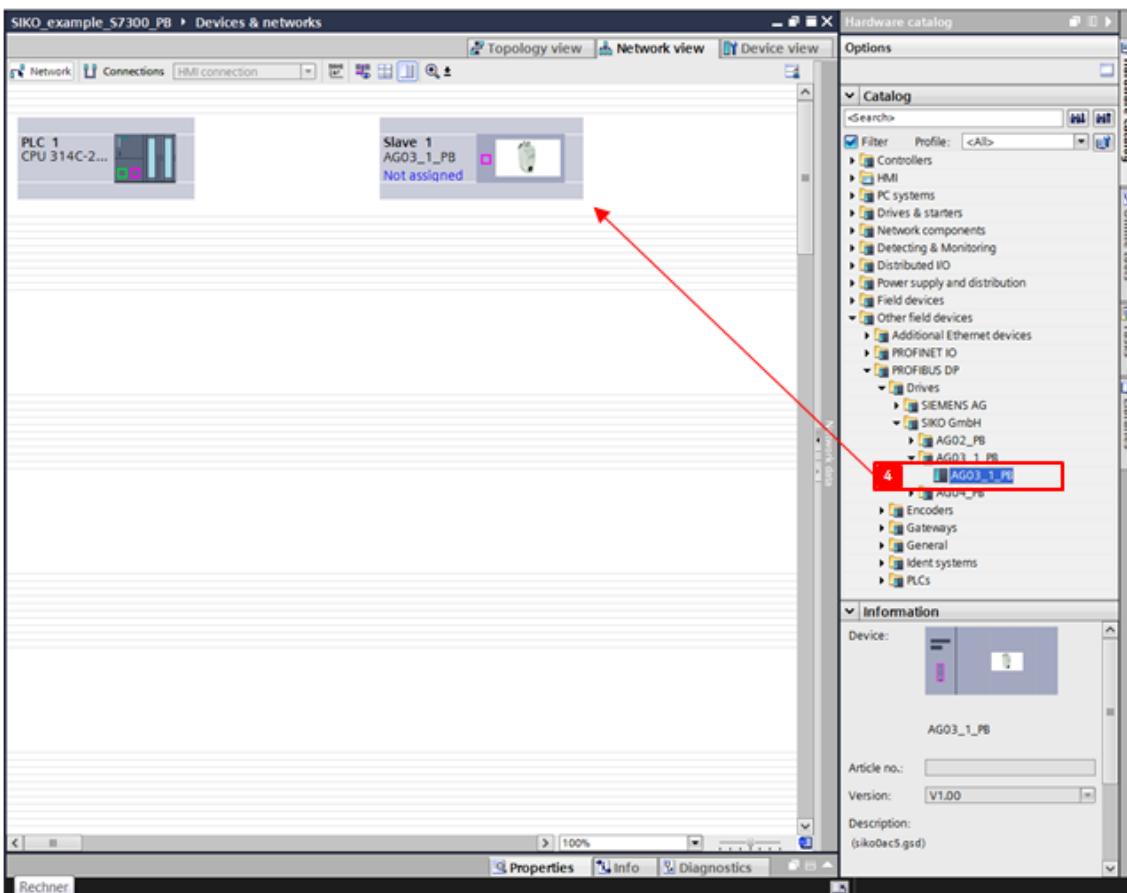
*Abb. 7: Add AG03/1*

1.7.5   Select the AG03/1

1. Left-click "Not assigned" inside the AG03/1 symbol.
2. Select master.
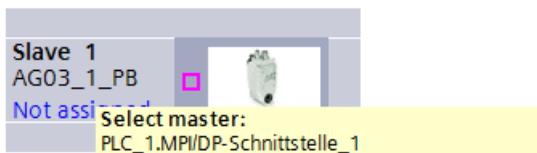
Abb. 8: Select Master

1.7.6   Configure the PROFIBUS® Address

1. Click on the PROFIBUS® contact point.
2. Set the PROFIBUS® address.
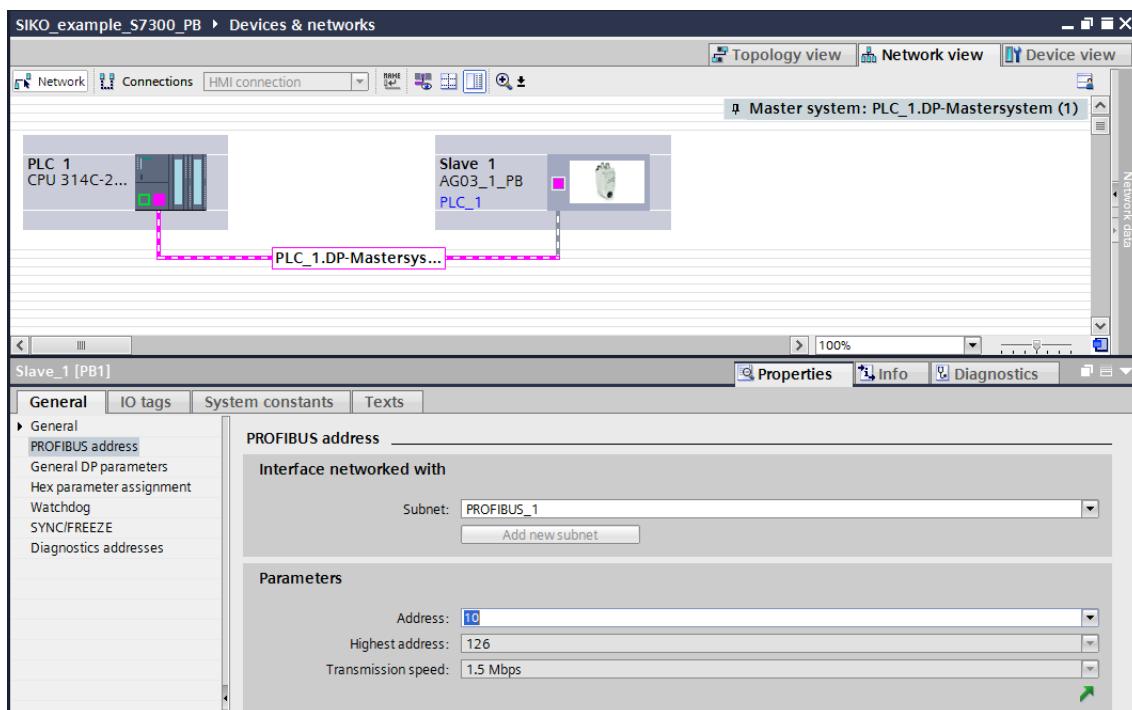
Abb. 9: Set PROFIBUS Address

1.7.7 Configure the I / O addresses of the AG03/1

1. Navigate to the tab "Device view" of the AG03/1.
2. Set the I / O addresses
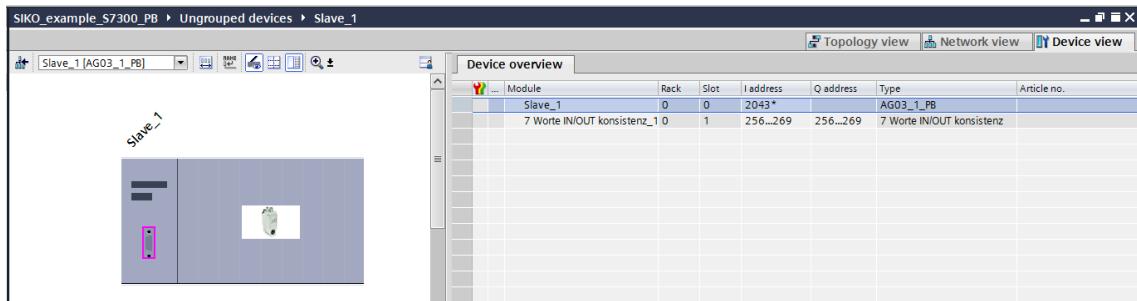
Abb. 10: I / O Addresses

1.7.8 Configure the IP Address of the PLC in the Project

NOTICE	The IP settings in this example can cause serious network problems under certain circumstances. If you are in doubt about the correct IP settings for your network, ask your system administrator for assistance.

1. Navigate to the tab "Device view" of the PLC.
2. Choose "PLC_1".
3. Double-click on CPU.
4. Left-click on "Ethernet addresses" from folder "PROFINET interface [X2]".
5. Select "Set IP address in the project".
6. Enter a valid IP address.
7. Enter a valid subnet mask.
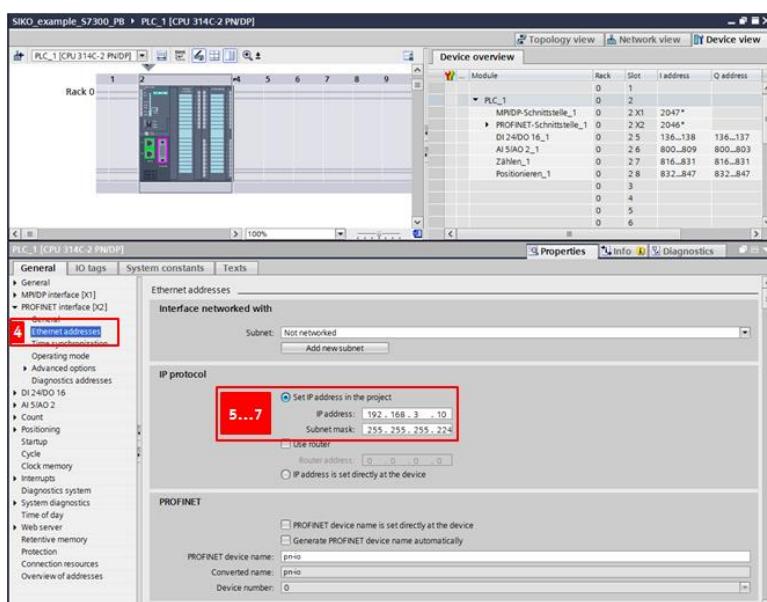
Abb. 11: IP Address and Subnet Mask

2 Software Configuration

2.1 Add Required Organication Blocks

Add OB82, OB86 and OB122 to the folder "Program blocks".

1. Double-click on "Add new block" from folder "Program blocks".
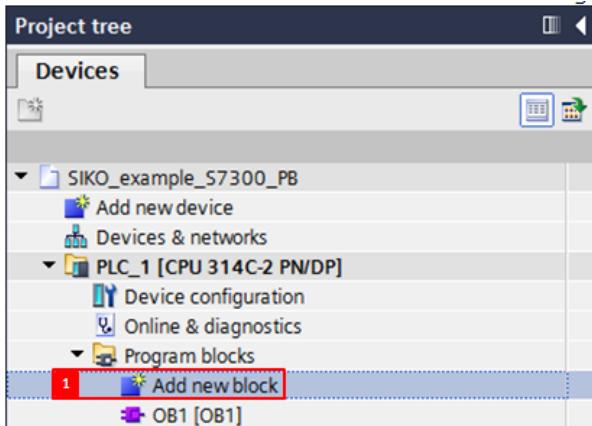
Abb. 12: Add New Block

2. Choose "OB82" from folder "Fault interrupts".

3. Choose language "STL".

4. Confirm with "OK".
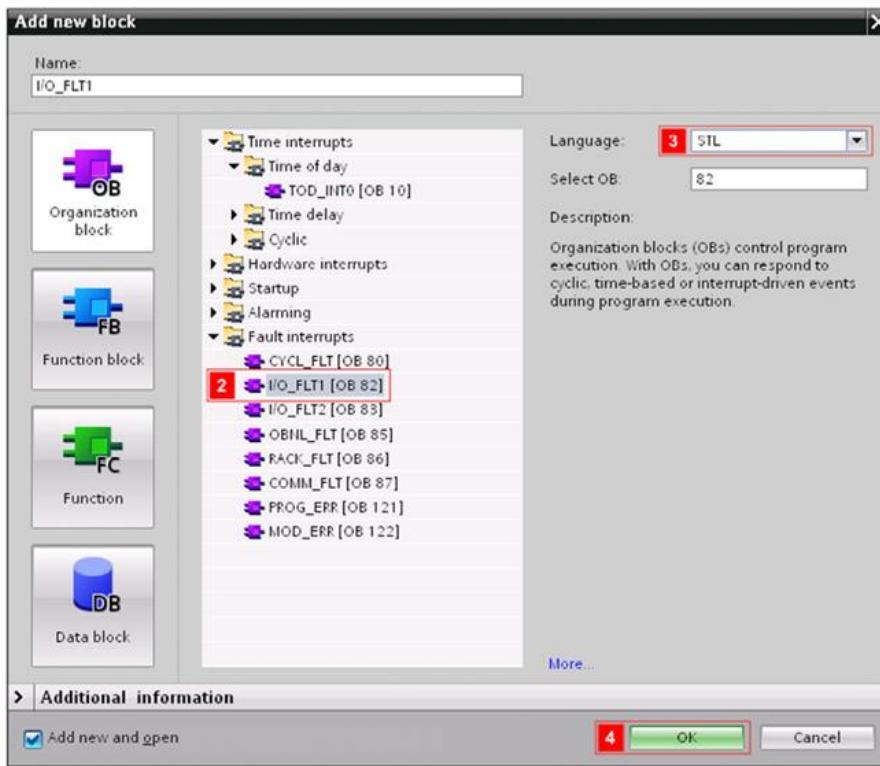
Abb. 13: Add OB82

5. Repeat steps 1 to 4 for OB86 and OB122.

2.2 Import the SIKO-library

1. Navigate to the tab "Device view".

2. Right-click in emty space inside the tab "Libraries".

3. Execute the command "Retrieve library...".
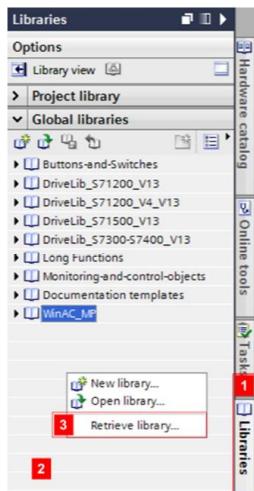
Abb. 14: Retrieve Library

4. Browse to the storage location of the SIKO-library.

5. Select the archive SIKO_AGXXvFPB_TIA_V14_SP1_S7300_LIB_V100.

6. Execute the command "Open".
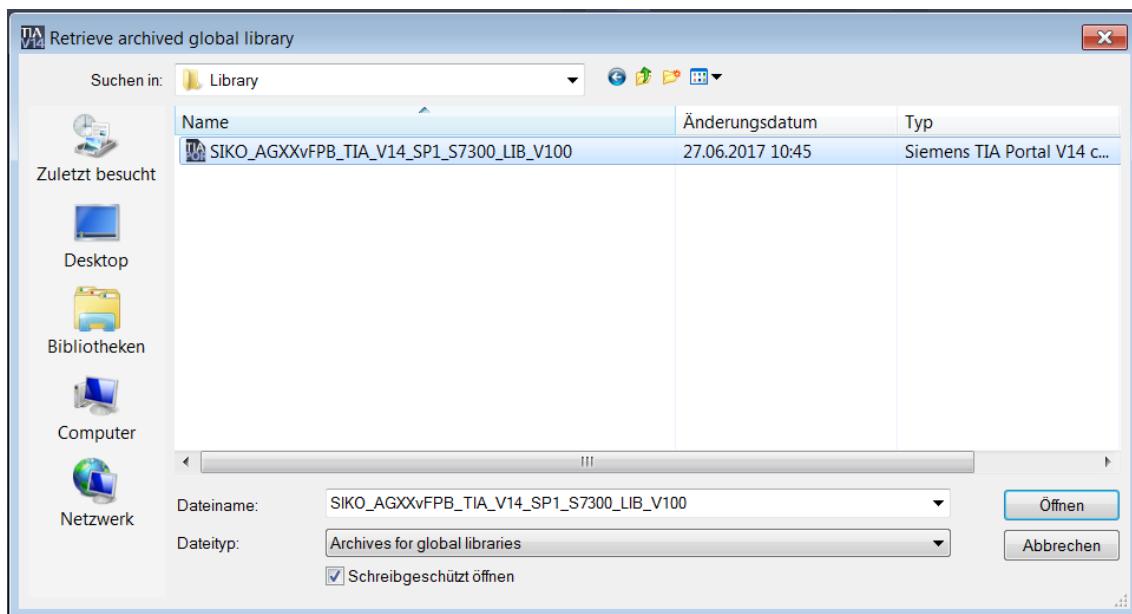
Abb. 15: Open Library

7. Choose a target directory to store the library.

8. The library appears in the "Global libraries" window.
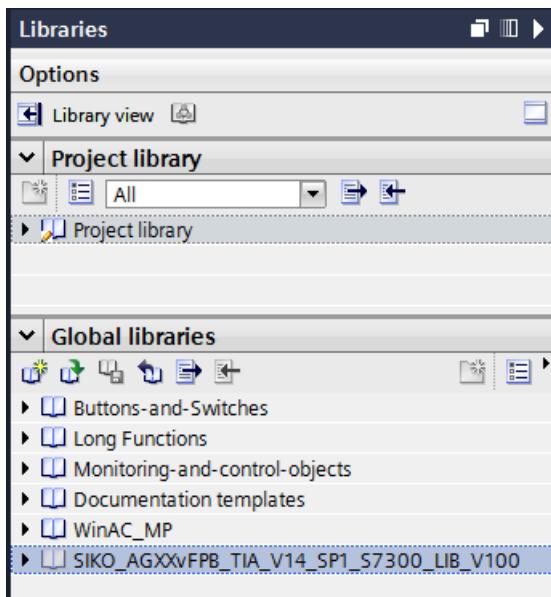
Abb. 16: Global Library

2.3   Switch Programming Language of OB1 to STL

1. Navigate to the project tree.

2. Go to the Program blocks folder.

3. Right-click on "Main [OB1]".

4. Switch programming language to STL.

5. Navigate to the tab "Device view".
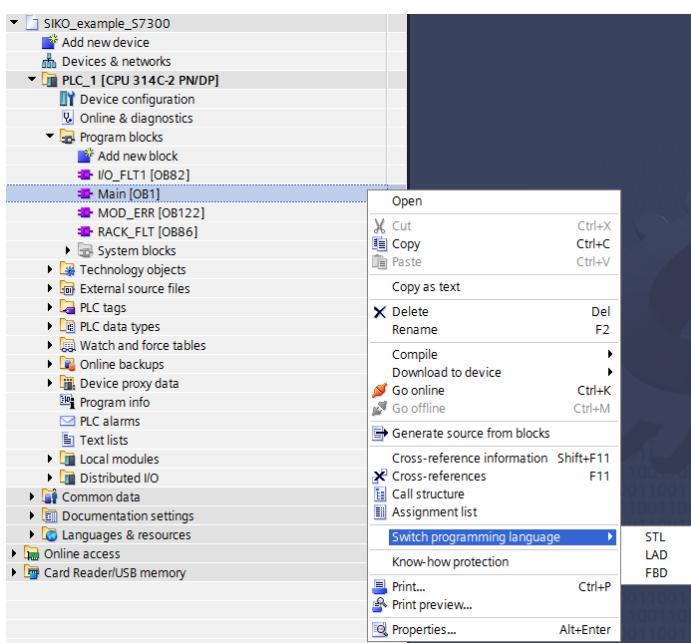
Abb. 17: Switch OB1 to STL

2.4   Function Block Call

1. Double-click on "OB1".
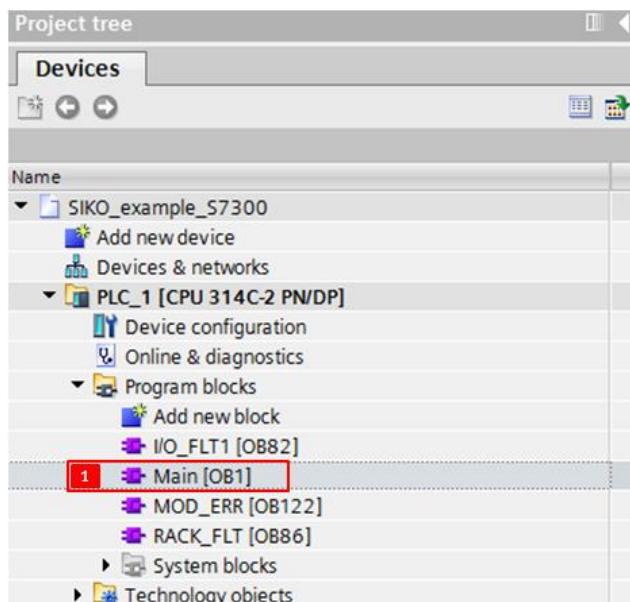
Abb. 18: Open OB1

2. The STL editor window is opened.
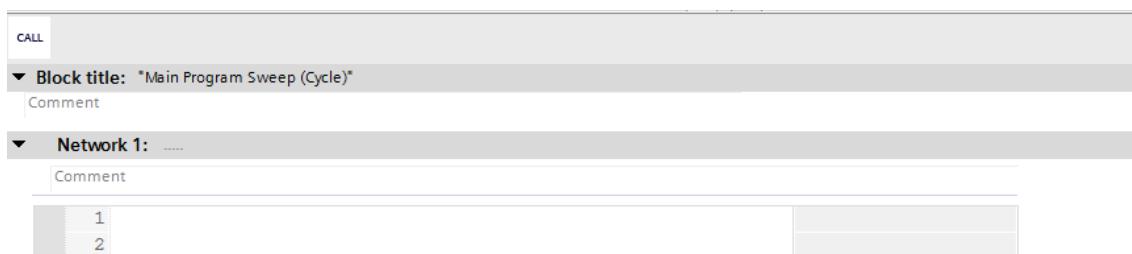
Abb. 19: STL Editor

3. Use drag and drop to move the function block "SIKO_DRV_AG03_1vPB" from the SIKO-library to the OB1 STL editor window.
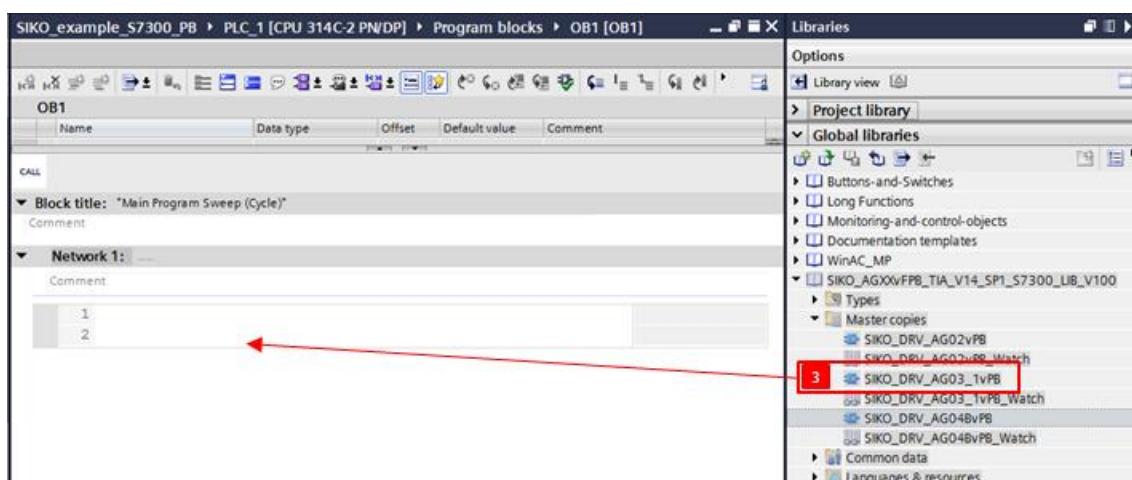
Abb. 20: Drag and Drop FB

4. Now the window "Call options" appears.

5. Select "Manual".

6. Enter "SIKO_DRV_AG02vPB_DB113" as name for the instance data block.

7. Enter Number "113".

8. Confirm with "OK".
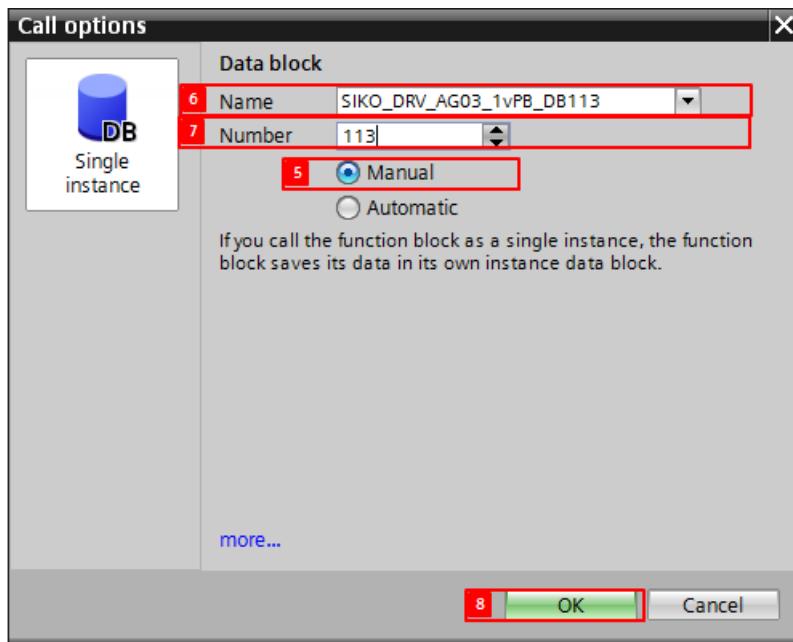
Abb. 21: Configure DB

2.4.1 Setup the Input and Output Addresses of the SIKO Function Block

To setup the input and output addresses of the function block the decimal address values from the hardware configuration have to be converted to hexadecimal values.

Abb. 22: Check I / O Addresses

In this example the conversion table looks like this:

Q address	256...269dec	DC_StartByteOut	W#16#100
I address	256...269dec	DC_StartByteIn	W#16#100

Table 2: Conversion Table

Abb. 23: Configure FB

After set up of the addresses save the settings and close the editior window.

2.5 Add the Watch Table "SIKO_DRV_AG03_1vPB_Watch" from the SIKO-library

1. Use drag and drop to move the watch table from the SIKO-library to the project folder "Watch and force tables".
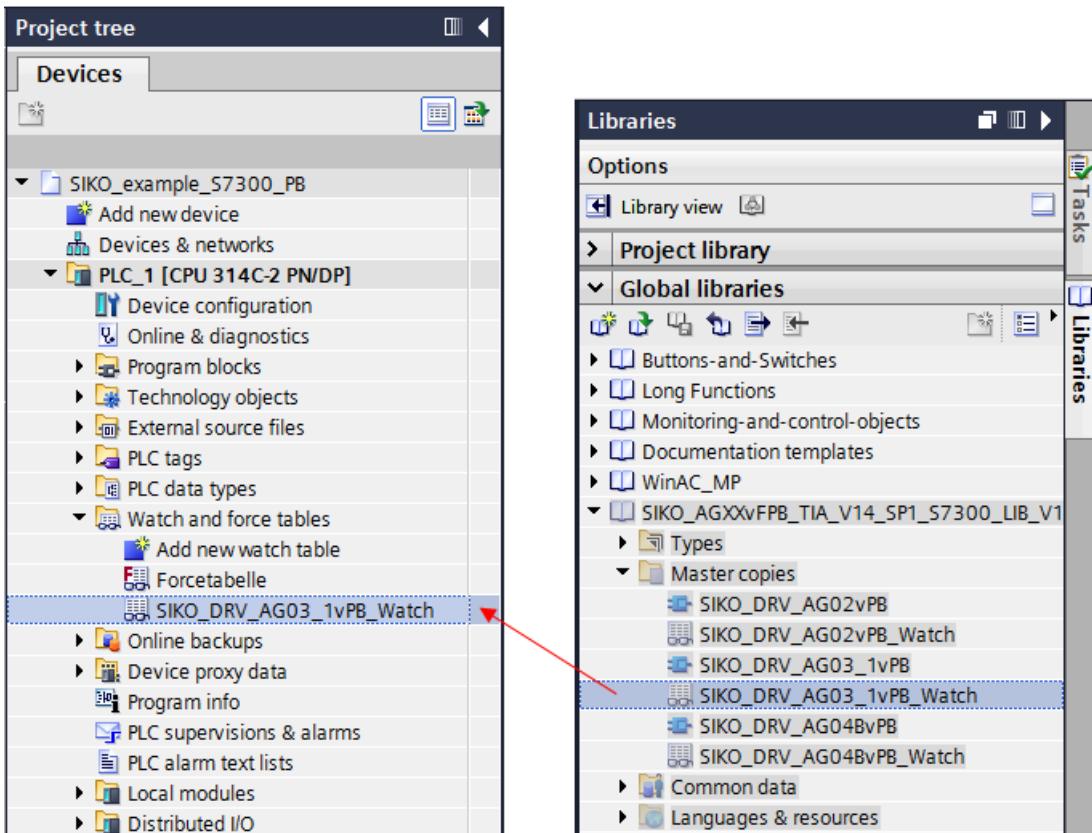
Abb. 24: Drag and Drop Watch Table

2.6 Complete the Project

1. Execute the command "Compile".

2. Execute the command "Download to device".

3. Execute the command "Save project".
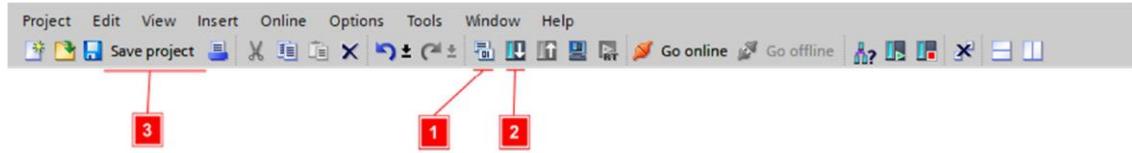
Abb. 25: Complete the Project

2.7 Work with the Project

1. Go online with your PLC.

2. Double-click on "SIKO_DRV_AG03_1vPB_Watch".

3. Left-click inside the watch table window.

4. Enable the "Monitor all" option in the watch table window.

5. Now you can control the SIKO-AG03/1 by setting the control bits.
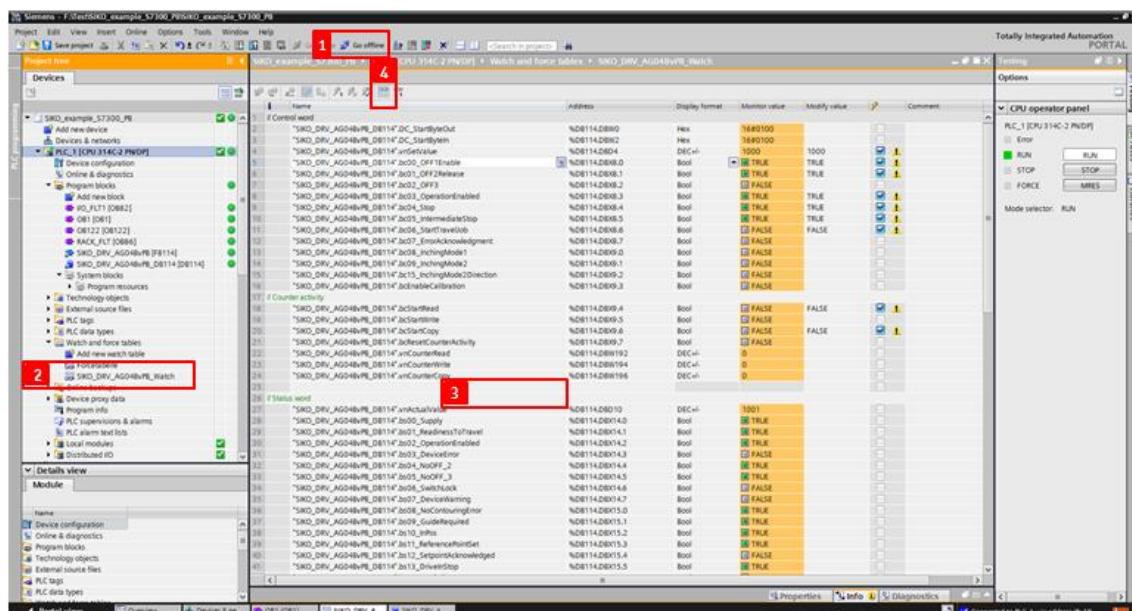
Abb. 26: Watch Table Online

3 Communication settings

3.1 Data Exchange

The FB is designed to send and receive continously the process data, consisting out of and "nSetValue", "nActualValue", control and status word bits.

3.2 Parameter Access

The present module contains the parameter data in addition to the process data (CW/SW). Parameters that can be changed (read/write) exist in programming as actual value (_r) and as target value (_w) as well. Furthermore, it is differentiated between pure read parameters (only indicated as actual value) and pure write parameters (only indicated as target value).

A rising edge must be applied either to the "bcStartRead" or to the "bcStartWrite" input on the module described here in order to enable a read or write process of one of the variables.

3.2.1 Read Parameters

If a rising edge is applied to the "bcStartRead" input, then all parameters will be read and can be used for further programming. If counter read value is not reset to "0" the read cycle was interrupted by read failure. This indicates to a communication failure.

3.2.2 Write Parameters

If a rising edge is applied to the "bcStartWrite" input of the module, then all parameters will be transferred to the module. If counter write value is not reset to "0" the write cycle was interrupted by a write failure. This indicates to a communication failure or parameter value is beyond range of value accepted by AG03/1.

3.2.3 Copy Parameters from Read to Write

If a rising edge is applied to the "bcStartCopy" input of the module, then all actual values (_r) are copied to their corresponding target values (_w).

3.3 Counter Value

Count read value	Count write value	Name	Value range (dec)	Default
1		0x396 Profibus Address		0
2	1	0x3A2 Operating mode	1 … 2	2
3 … 12		0x3B1 Fault buffer		0
13		0x3B8 Number of faults		0
14		0x3C1 Hardwareversion		0

Count read value	Count write value	Name	Value range (dec)	Default
15		0x3C5 Softwareversion		0
16	2	0x3E8 Controller Parameter P	1 ... 500	100
17	3	0x3E9 Controller parameter I	0 ... 500	5
18	4	0x3EA Controller parameter D	0 ... 500	0
19	5	0x3EB a – Pos	1 ... 100	50
20	6	0x3EC v – Pos	Gear 48 : 1 => 1 ... 100 24 : 1 => 1 ... 200	30
21	7	0x3ED a – Rot	1 ... 100	50
22	8	0x3EF a – Inch	1 ... 100	50
23	9	0x3F0 v – Inch	Gear 48 : 1 => 1 ... 100 24 : 1 => 1 ... 200	30
24	10	0x3F1 Pos- Window	0 ... 1000	10
25	11	0x3F2 ü- Numerator	1 ... 10000	1
26	12	0x3F3 ü – Denominator	1 ... 10000	1
27	13	0x3F4 Spindle pitch	0 ... 1000	0
28	14	0x3F5 Sense of rotation	0 ... 1	0
29	15	0x3F6 Pos- type	0 ... 2	0
30	16	0x3F8 Upper limit	-9999999 ... 9999999	1000000
31	17	0x3F9 Lower limit	-9999999 ... 9999999	-1000000
32	18	0x3FA Calibration value	-999999 ... 999999	0
33	19	0x3FB Delta Inch	-1000000 ... 1000000	1600
34		0x3FC Systemstatus word		0
35	20	0x3FD Stop mode Inch2	0 ... 1	0
36	21	0x3FE In pos mode	0 ... 2	0
37	22	0x3FF Loop length	0 ... 10000	800
38		403h Device temperature		0
39		405h Motor current		0
40		407h General status register		0
41	23	408h Torque deactivation	20 ... 125	125
42		409h Serial number		0
43		40Ah Date of production		0
44	24	40Bh Offset inching 2	10 ... 100	100
45		40Ch Position value		0
46	25	40Fh d-Pos	1 ... 101	101
47		410h Supply voltage output stage		0
48		411h Supply voltage control		0
49		412h Battery voltage		0

Count read value	Count write value	Name	Value range (dec)	Default
	26	3CAh Load parameter data record		0

Table 3: Counter Value