

# AG25, AG26

## PROFINET Interface Module for SIMATIC® Manager

Software description



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## 1 General notes

The function block has been tested with SIMATIC® S7-300 CPU 314C-2 PN/DP.

The interface module was engineered with SIMATIC® Manager V5.5 + SP3.

### 1.1 Requirements

- Basic knowledge of handling and programming Siemens systems.
- Familiarity with PROFINET.

### 1.2 Liability

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### 1.3 Versions overview

This manual is related to the project "SIKO\_example" and library "SIKO\_AG2X\_LIB\_V100".

### 1.4 List of abbreviations

EPN	PROFINET
SW	Status Word
CW	Control Word

## 2 Hardware configuration

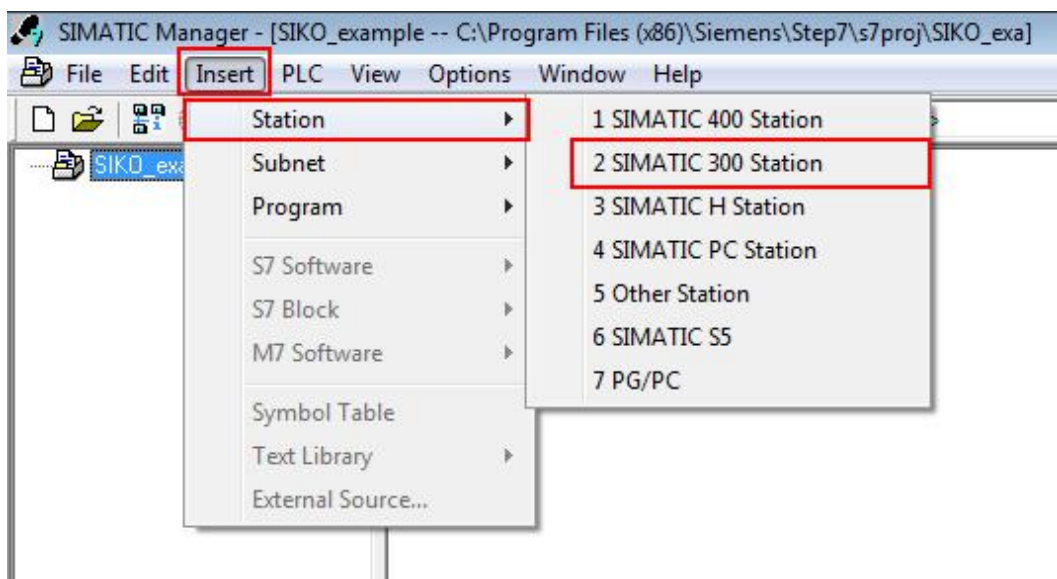
### 2.1 Create new project

Before the hardware can be used it must be configured first. Therefore we have to create a new project.

1. Start the SIMATIC® Manager and create a new project.
2. Enter the name of the project, for example "SIKO\_example".
3. Select the project name on the left side.

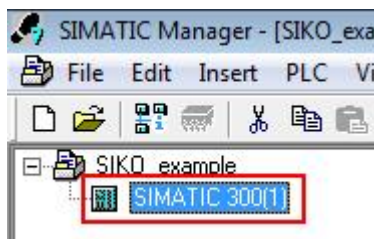


4. Insert a new S7-300 station by using the command "Insert" > "Station" > "SIMATIC 300 Station".

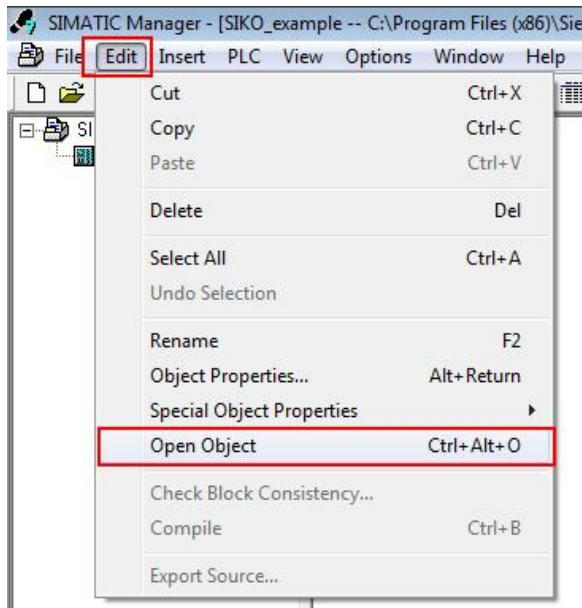


The new station appears below the project name.

5. Select the new station on the left side.

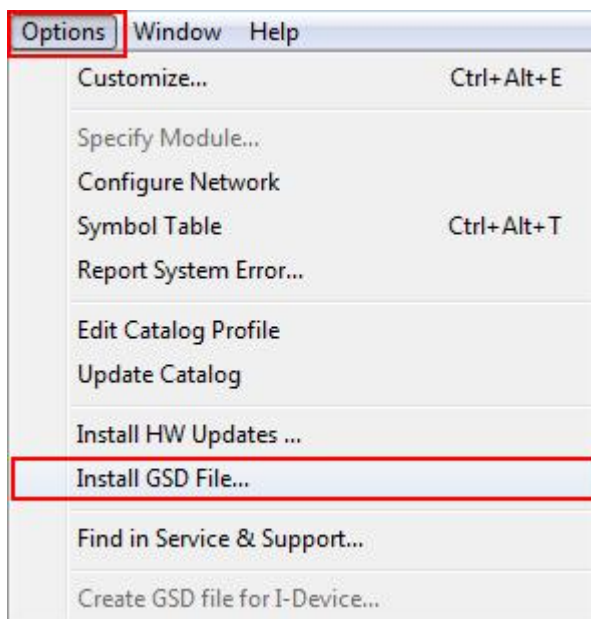


6. Open the hardware configuration tool with command "Edit" > "Open Object".



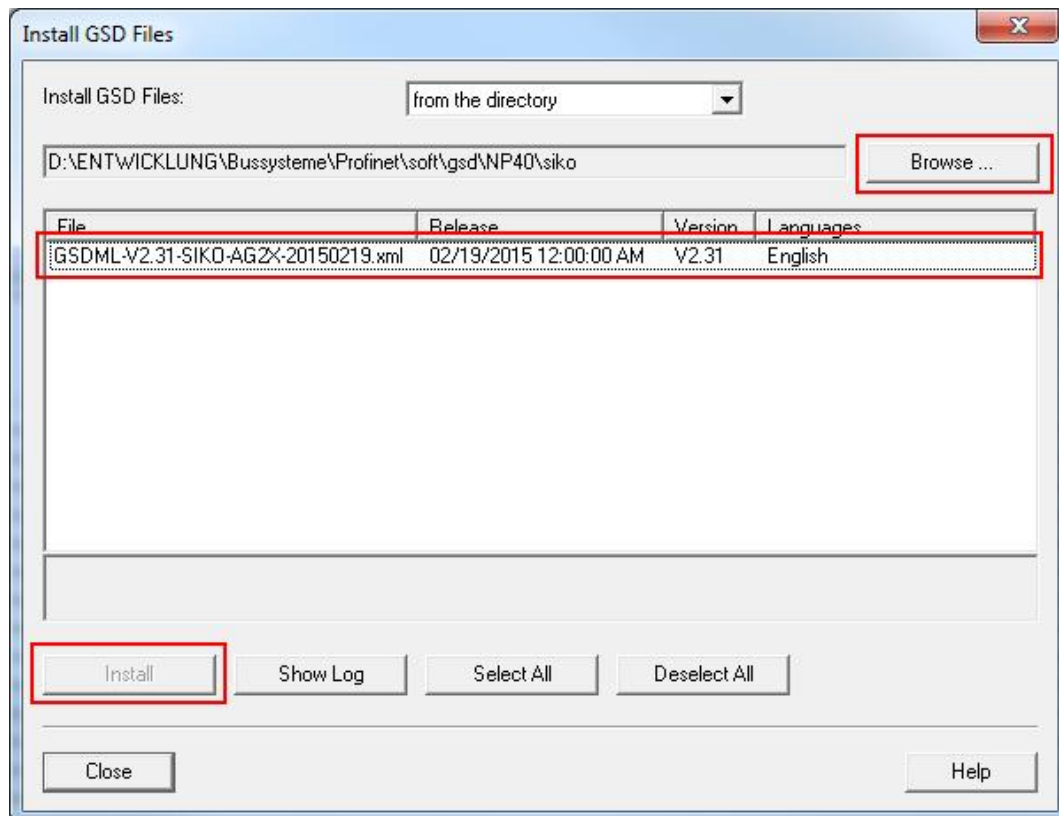
Now an empty hardware configuration window is opened.

7. Install GSD for AG2X via command "Options" > "Install GSD File..."



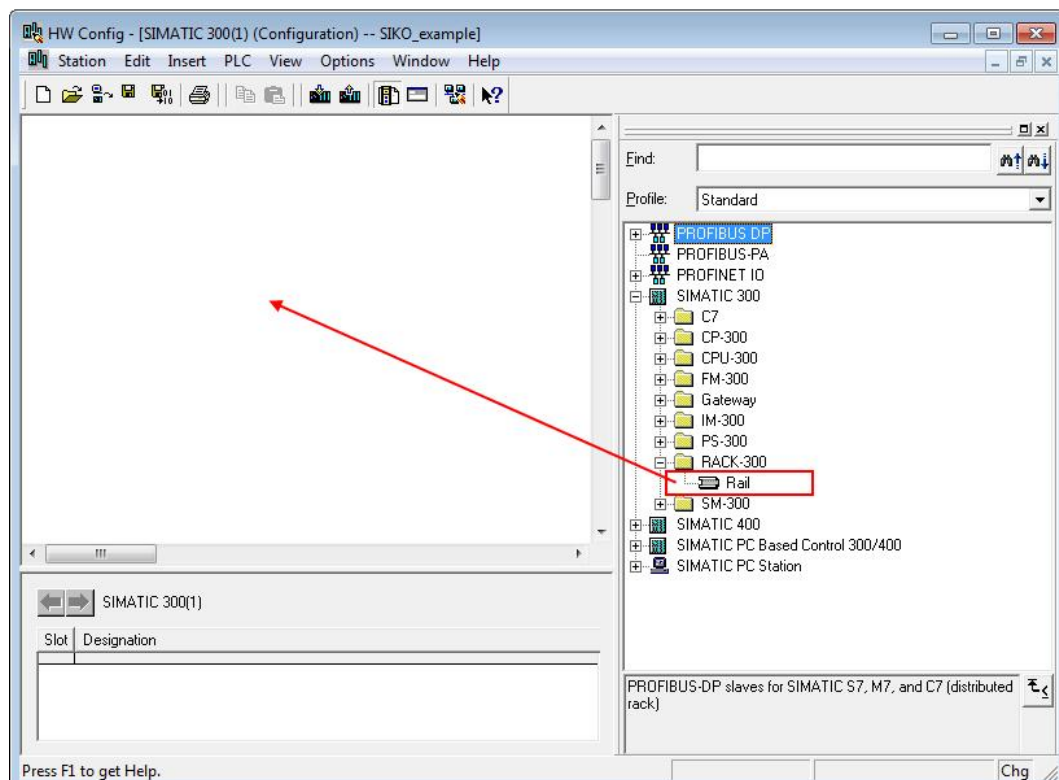
8. Browse to the storage location of the GSD file and choose the actual version.

9. Install the selected file.

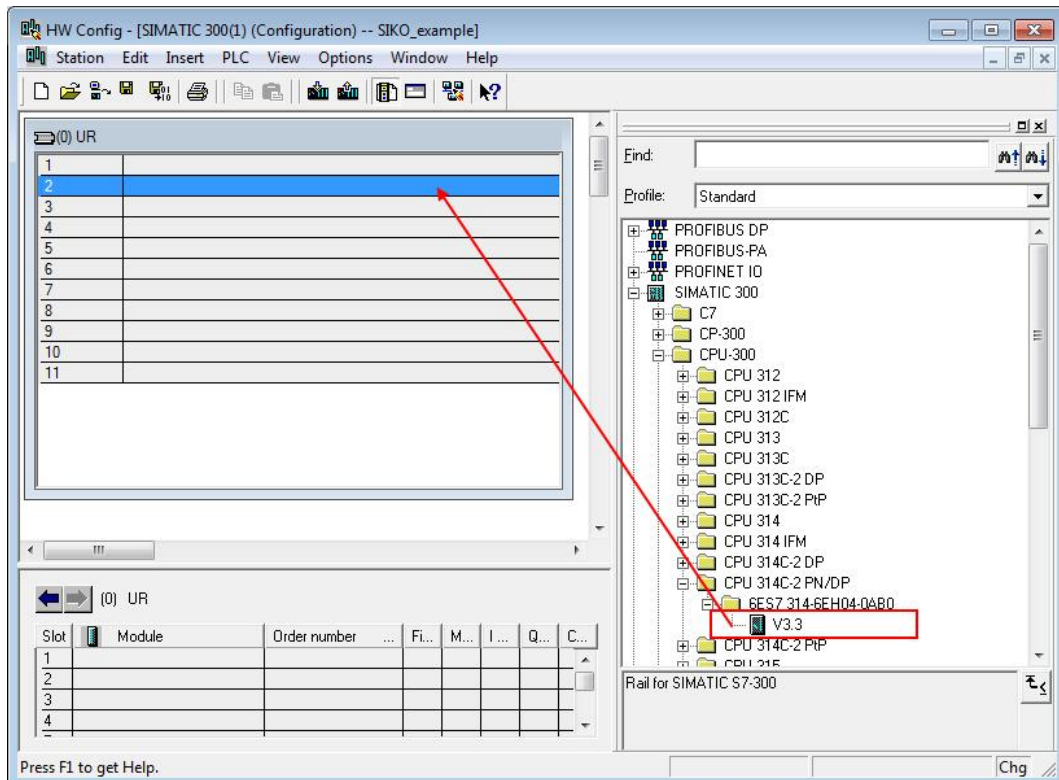


After installation the AG2X is available in the hardware catalog.

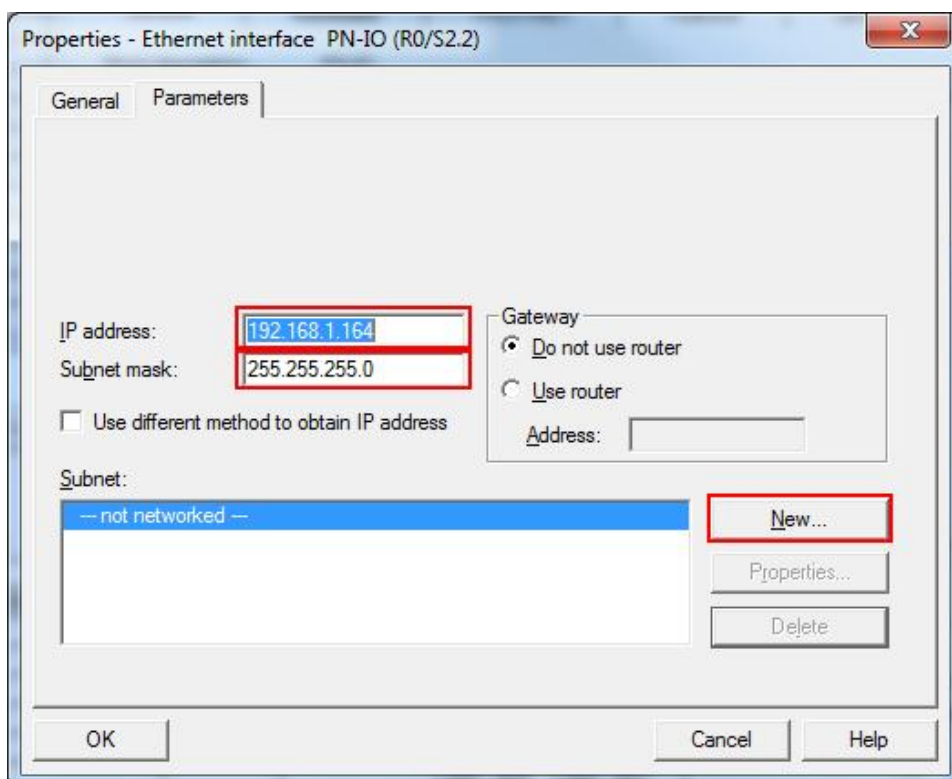
10. Choose "Rail" from the folder "RACK-300" of the hardware catalog on the right side. Use drag and drop to move the "Rail" to the hardware configuration.



11. Choose the CPU from the hardware catalog and plug it into slot 2 of the rail.



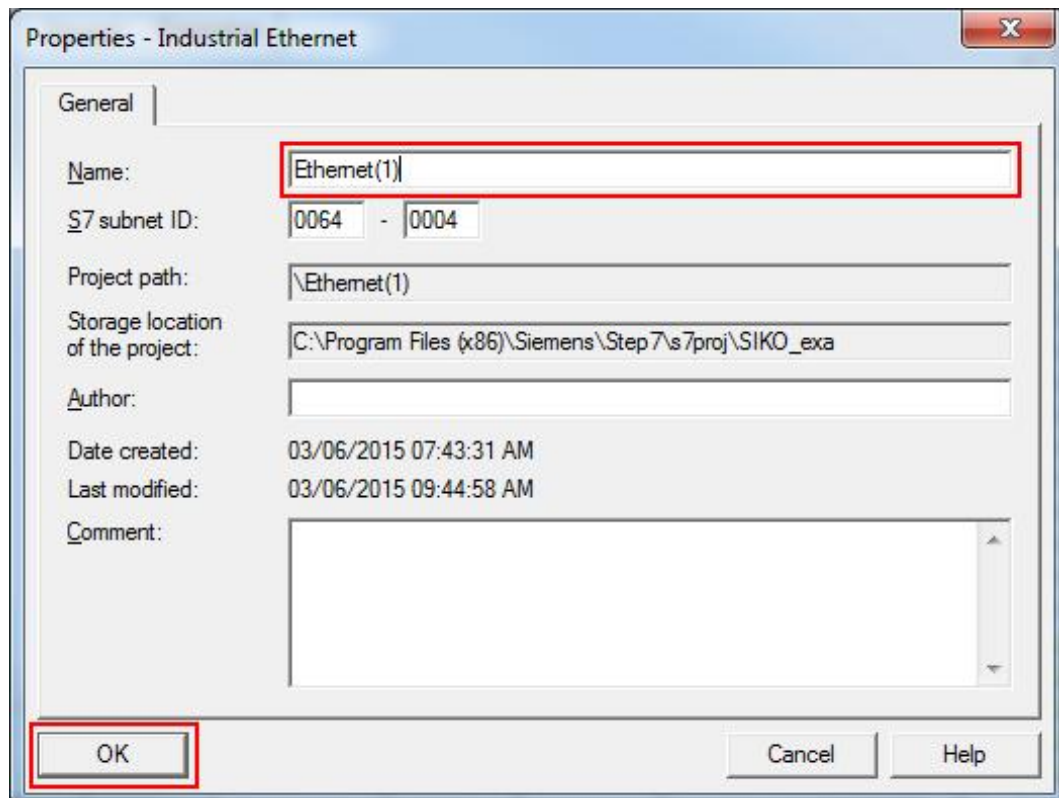
Now the "Properties - Ethernet interface" window appears.



12. Enter a valid IP address and subnet mask.

13. Create a new Subnet.

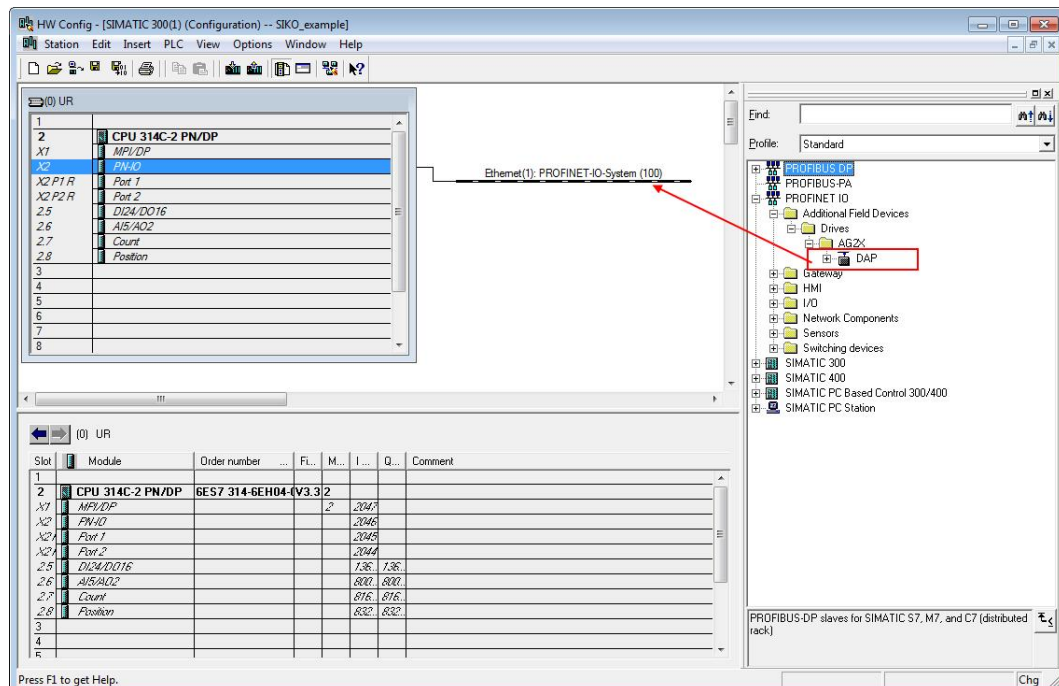




14. Confirm the settings with "OK"

15. Close the "Properties - Ethernet interface" window.

16. Choose "DAP" within the folder "AG2X" from the hardware catalog and attach it to the PROFINET subnet using drag and drop.



17. Open the properties window of the AG2X by double clicking on the drive symbol.



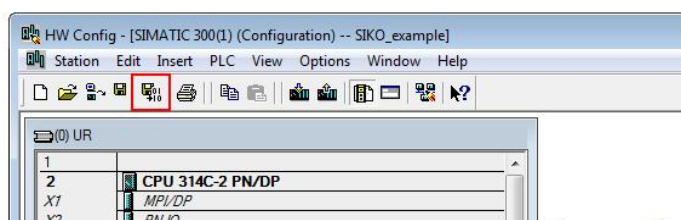


18. Enter a device name.

19. Enter a valid IP address.

20. Confirm the settings with "OK".

21. Save and compile the hardware configuration.



22. Close "HW Config".

The hardware configuration of the project is now complete.

## 2.2 Communication settings

After setup of the project the hardware must be configured.

### 2.2.1 Display accessible nodes

1. Execute the command "PLC" > "Edit Ethernet Node..."
2. Use the "Browse" button to find accessible nodes.

The 'Edit Ethernet Node' dialog box is shown. It has several sections: 'Ethernet node' with a 'MAC address' field and a 'Browse...' button (highlighted with a red rectangle); 'Set IP configuration' with radio buttons for 'Use IP parameters' (selected) and 'Obtain IP address from a DHCP server'; 'Identified by' with radio buttons for 'Client ID' (selected), 'MAC address', and 'Device name'; 'Assign device name' with a 'Device name' field and an 'Assign Name' button; and 'Reset to factory settings' with a 'Reset' button. At the bottom are 'Close' and 'Help' buttons.

3. Choose device type "SIKO-AG2X" from the list.

The 'Browse Network - 2 Nodes' dialog box is shown. It has a 'Start' button, a 'Stop' button, and a checked 'Fast search' checkbox. Below these is a table with two rows of data. The first row is highlighted with a red rectangle. At the bottom, there is a 'Flash' button, a 'MAC address' field, and 'OK', 'Cancel', and 'Help' buttons. The 'OK' button is highlighted with a red rectangle.

!	IP address	MAC address	Device type	Name
	0.0.0.0	00-30-11-0E-41-42	SIKO-AG2X	
	192.168.1.164	28-63-36-21-09-06	S7-300	pn-io

4. Confirm with "OK".

### 2.2.2 Set up of the communication settings of the device

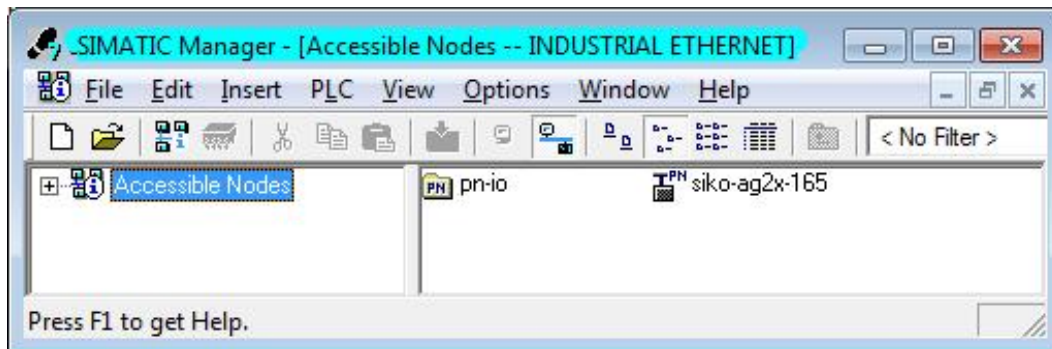
The screenshot shows the 'Edit Ethernet Node' window with the following configuration details:

- Ethernet node:** MAC address: 00-30-11-0E-41-42, Nodes accessible online: Browse...
- Set IP configuration:**
  - ☒ Use IP parameters
    - 1** IP address: 192.168.1.165
    - 2** Subnet mask: 255.255.255.0
    - Gateway: ☒ Do not use router, ☐ Use router (Address: )
  - ☐ Obtain IP address from a DHCP server
- Identified by:** ☒ Client ID, ☐ MAC address, ☐ Device name. Client ID:
- 3** Assign IP Configuration
- Assign device name:** Device name: **4** siko-ag2x-165, **5** Assign Name
- Reset to factory settings:** Reset
- 6** Close, Help

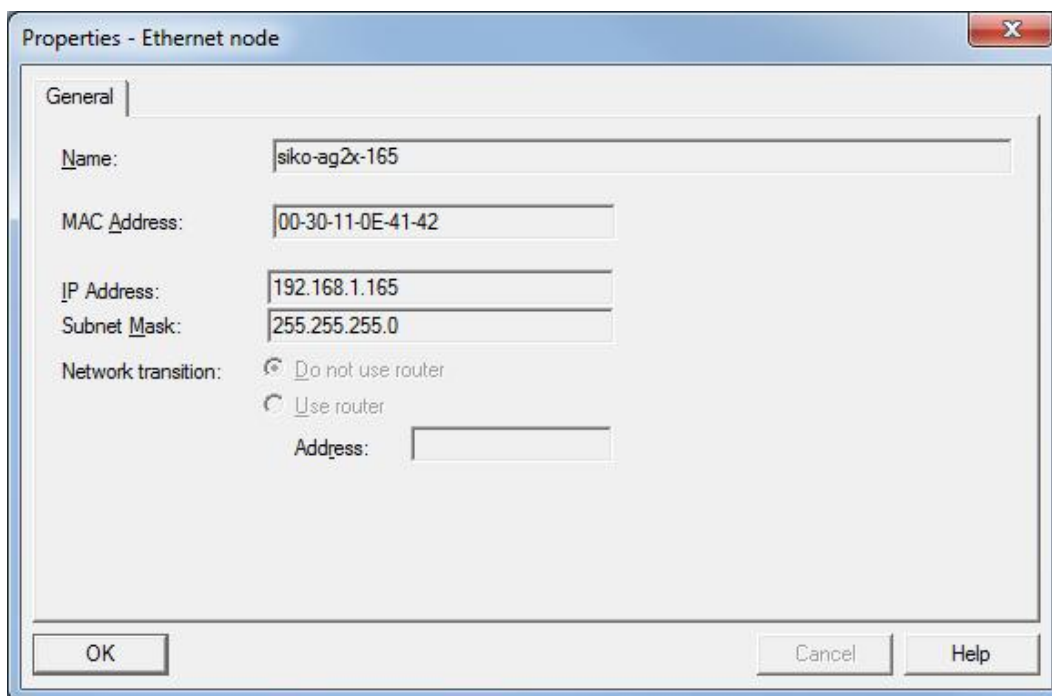
1. Enter a valid IP Address.
2. Enter a valid subnet mask.
3. Execute command "Assign IP Configuration".
4. Enter a valid device name.
5. Execute command "Assign Name".
6. Close the Edit Ethernet Node window.

### 2.2.3 Check settings

1. Check the settings via command "PLC" > "Display Accessible Nodes".



2. Select node "siko-ag2x-165".
3. Execute command "Edit" > "Object Properties...".
4. Now the actual settings are shown.



5. Confirm "OK".
6. Close the Accessible Nodes window.

### 3 Software configuration

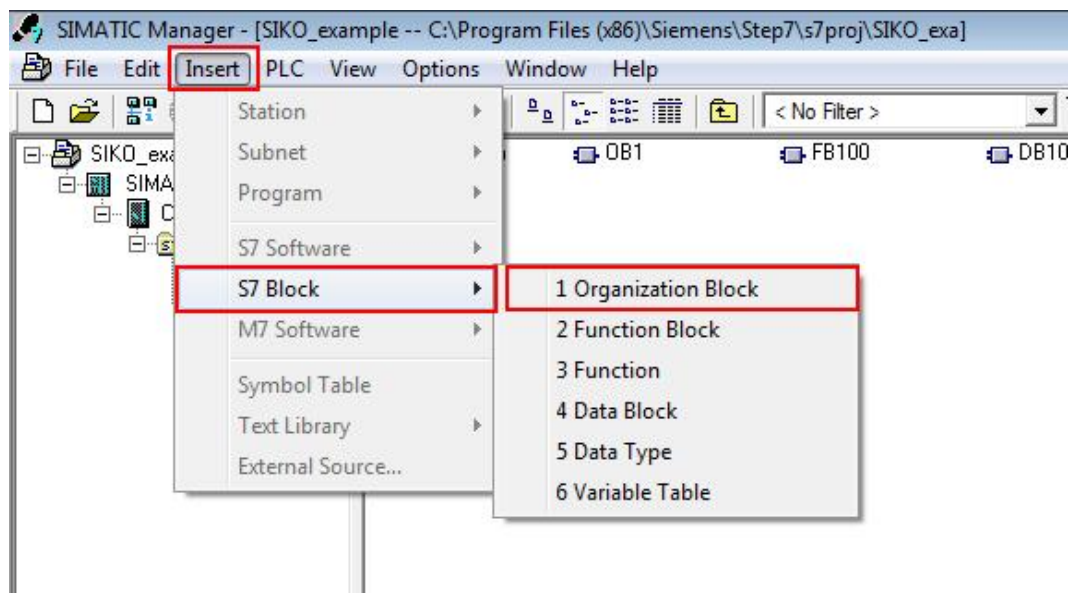
#### 3.1 Import SIKO library

1. Execute command "File" > "Retrieve".
2. Choose library SIKO\_AG2X\_VXXX.zip.

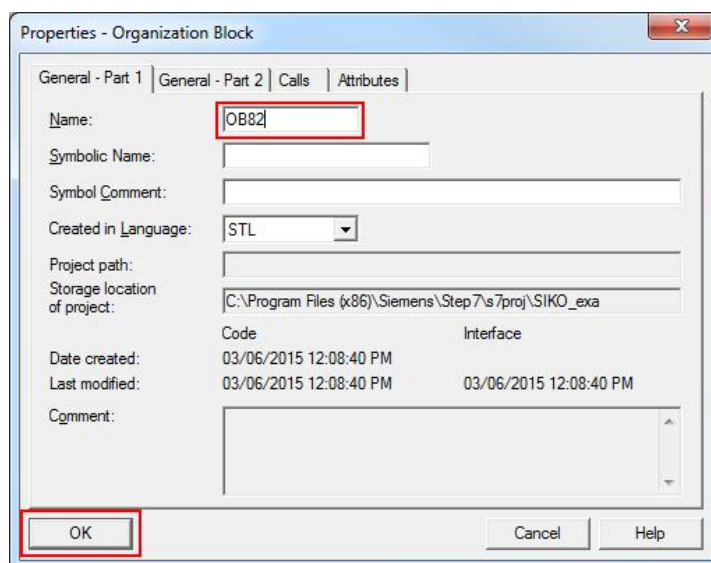
#### 3.2 Add required function blocks

Add OB82, OB86 and OB122 to the folder "Blocks".

1. Select folder "Blocks".
2. Execute command "Insert" > "S7 Block" > "1 Organization Block".



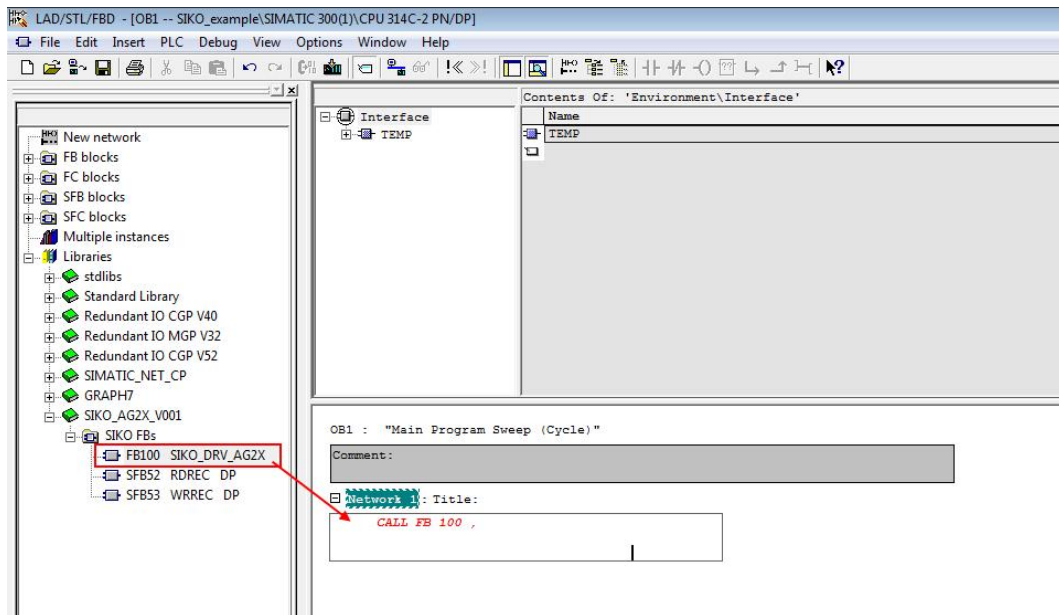
3. Enter organization block name "OB82".



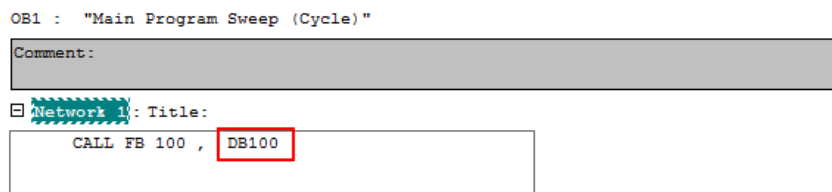
4. Repeat steps 2 and 3 with block name "OB86" and "OB122".

### 3.3 Call SIKO function block cyclically

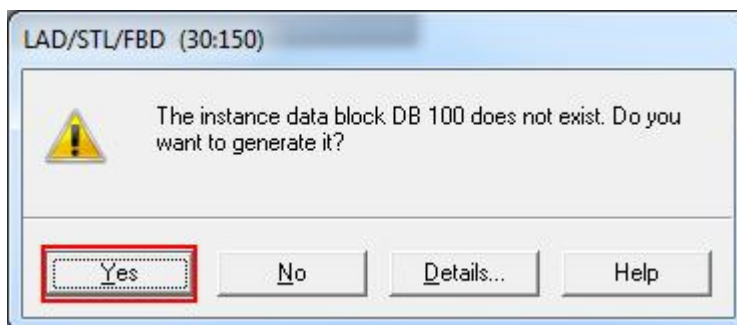
1. Double click on "OB1".
2. Add function block FB100 from library to main program.



3. Enter the name "DB100" for instance data block.

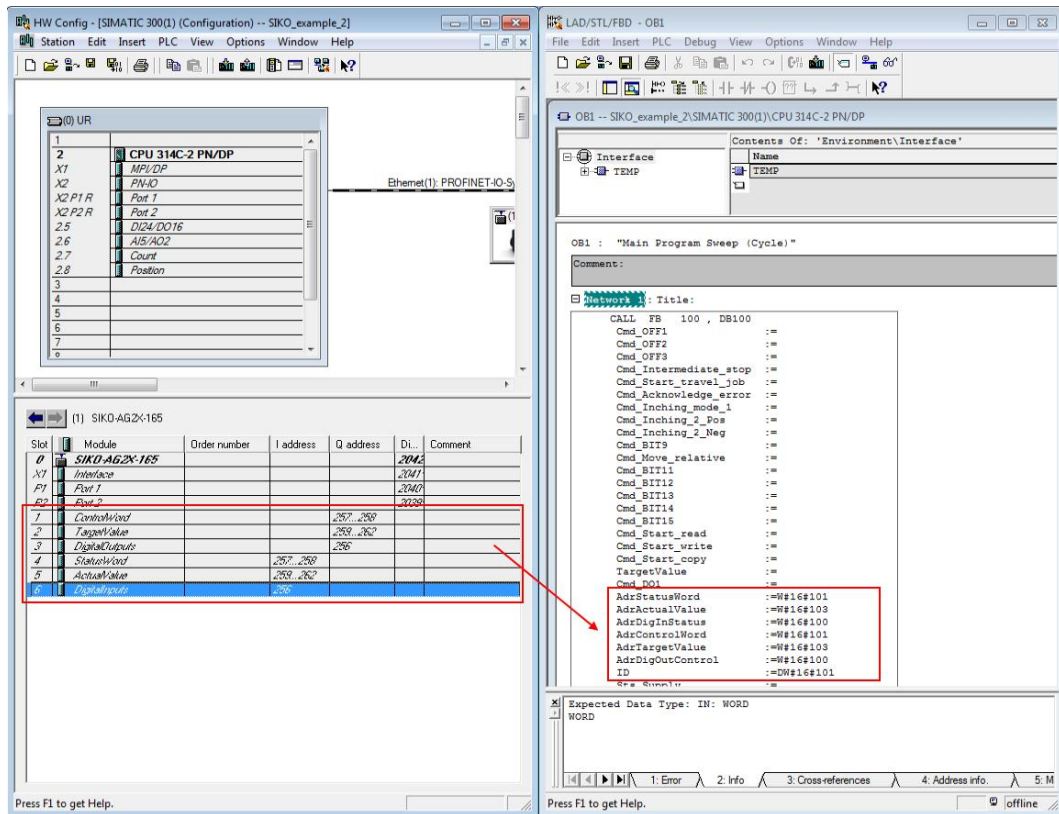


4. Confirm the message window with "Yes".



### 3.3.1 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.



In this example the conversion table looks like this:

ControlWord	257...258dec	AdrControlWord	W#16#101
TargetValue	259...262dec	AdrTargetValue	W#16#103
DigitalOutputs	256dec	AdrDigOutControl	W#16#100
StatusWord	257...258dec	AdrStatusWord	W#16#101
ActualValue	259...262dec	AdrActualValue	W#16#103
DigitalInputs	256dec	AdrDigInStatus	W#16#100

The input "ID" of the function block must be connected with the address of slot number 4.

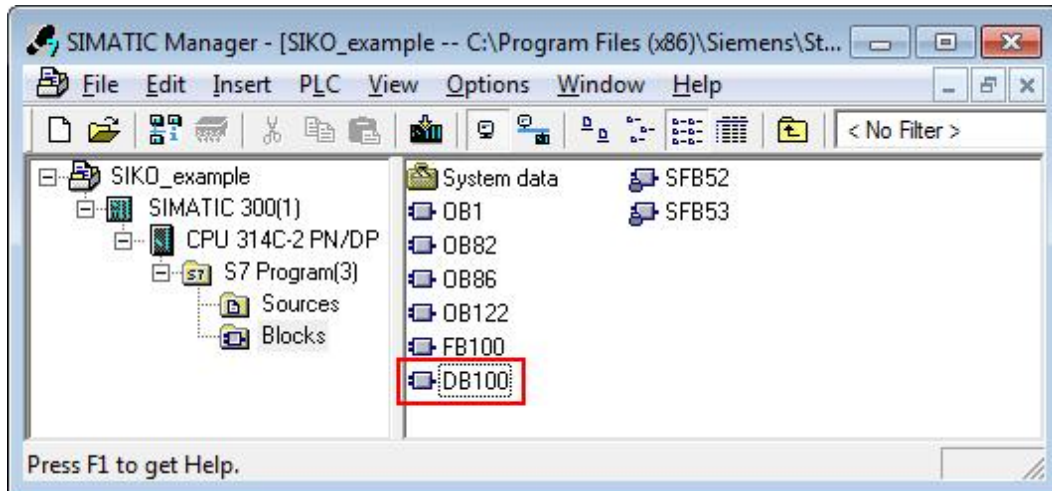
In this case the address equals the address of the StatusWord DW#16#101.

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

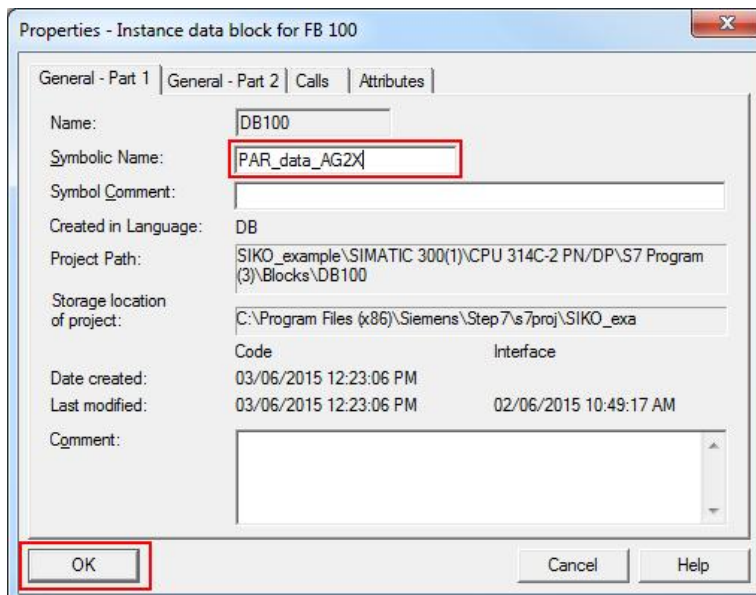


### 3.4 Enter symbol name for data block

1. Select "DB100".



2. Execute command "Edit" > "Object properties...".

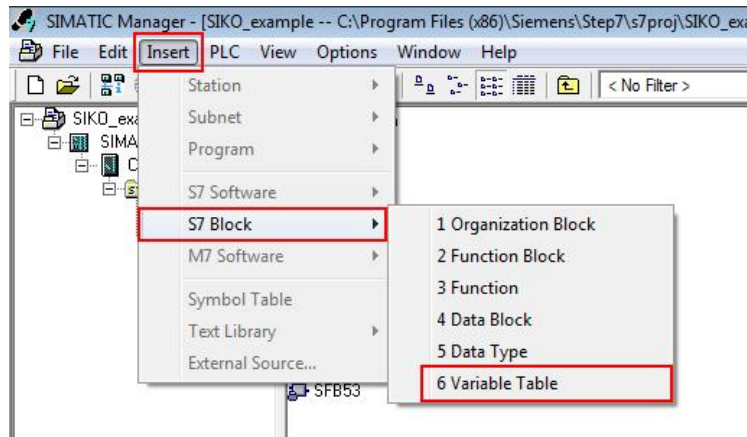


3. Enter the symbolic name "PAR\_data\_AG2X".
4. Confirm the input with "OK".

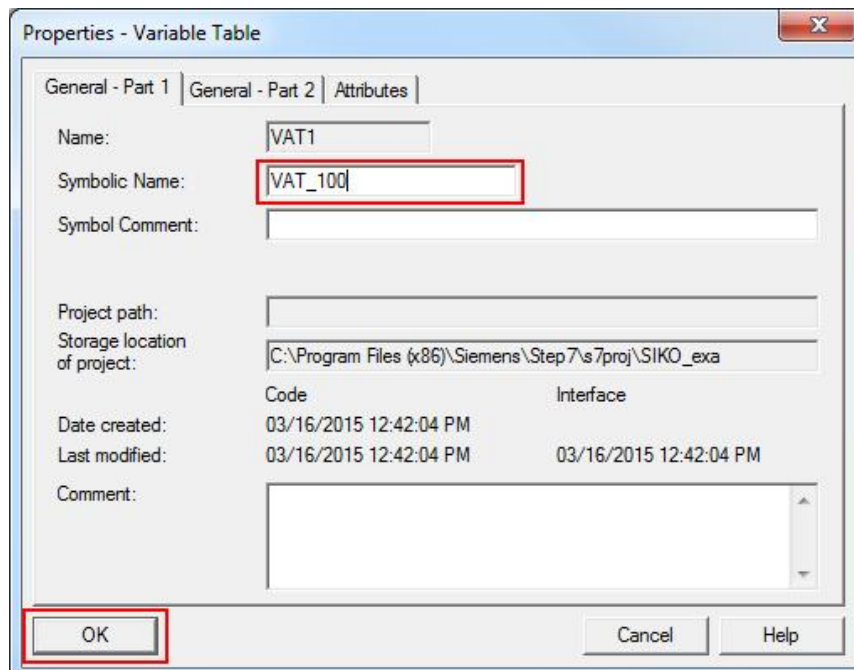
### 3.5 Variable table for testing

#### 3.5.1 Insert variable table

1. Execute command "Insert" > "S7 Block" > "6 Variable Table".

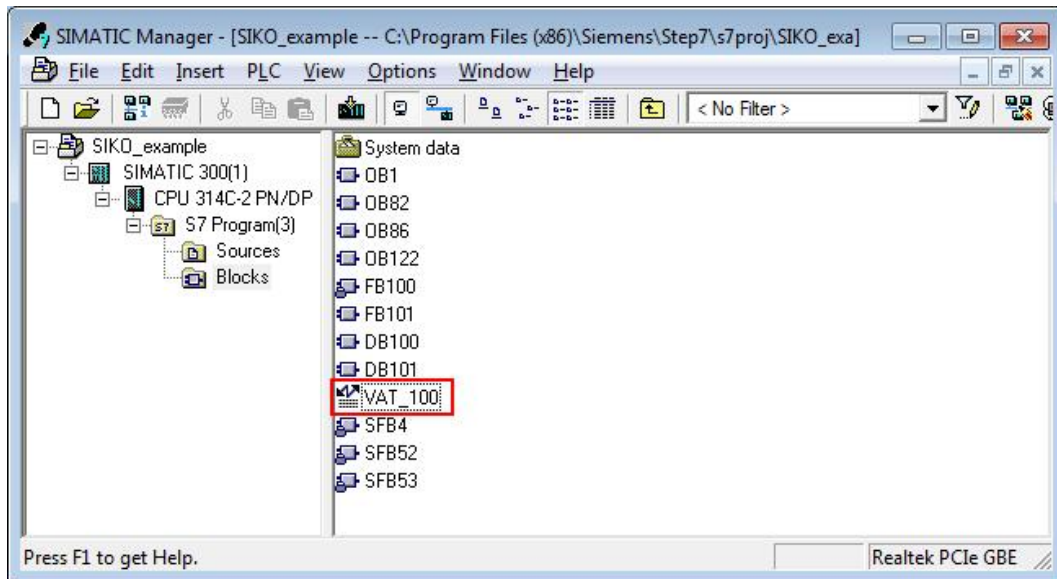


2. Enter the symbolic name "VAT\_100".



3. Confirm the input with "OK".

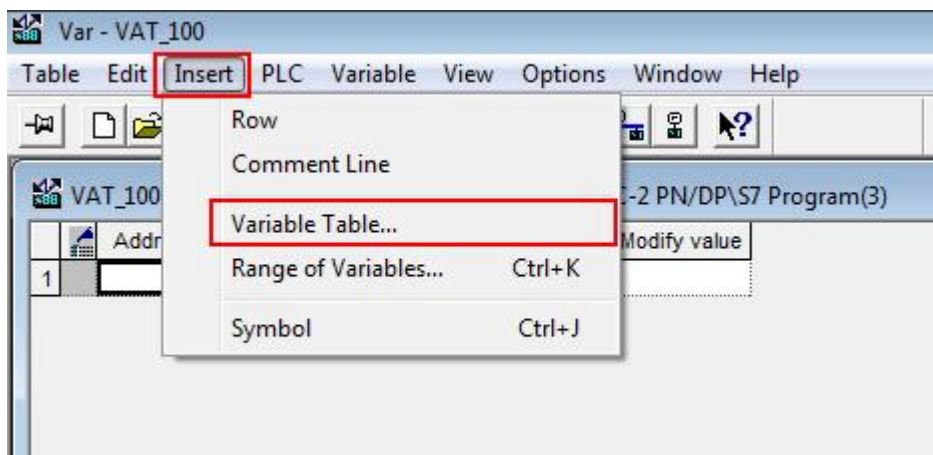
4. Select "VAT\_100".



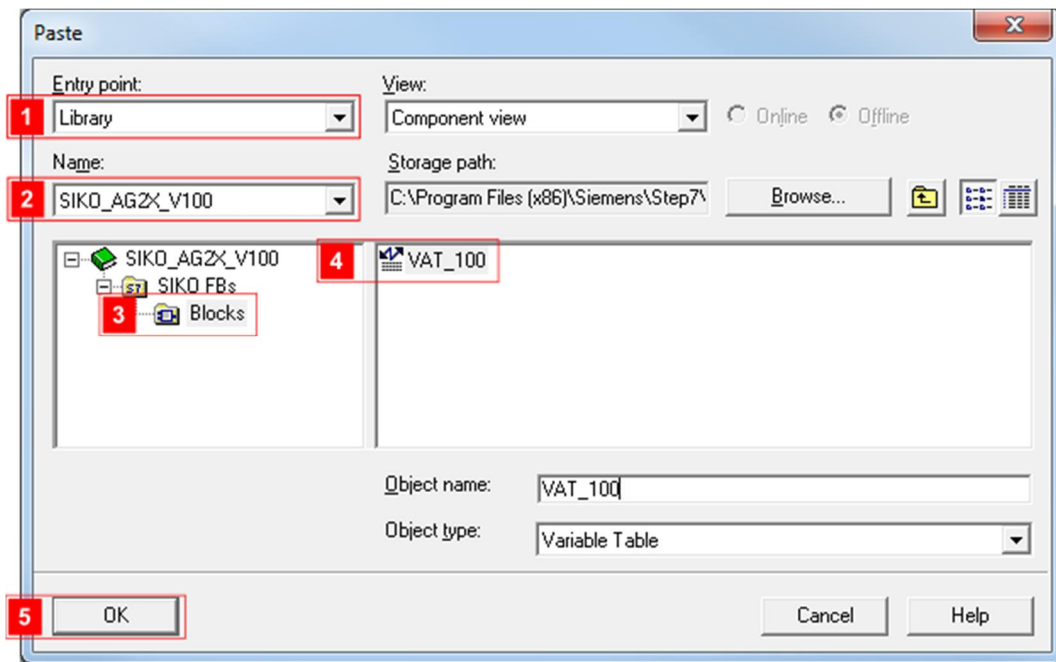
5. Execute command "Edit" > "Open Object".

### 3.5.2 Choose variable table for import

1. Execute command "Insert" > "Variable Table...".



### 3.5.3 Edit paste options for variable table import



1. Choose Entry point: Library.
2. Choose Name "SIKO\_AG2X\_VXXX".
3. Choose Folder "Blocks".
4. Select "VAT\_100".
5. Confirm settings with "OK".
6. Save the settings and close the variable table window.

### 3.6 Download project to PLC

Execute command "PLC" > "Download".

### 3.7 Software example

#### 3.7.1 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 "Cmd\_Start\_read" or to the "Cmd\_Start\_write" input on the module described here in order to enable a read or write process of one of the variables.

#### 3.7.2 Read parameters

If a rising edge is applied to the "Cmd\_Start\_read" 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.

#### 3.7.3 Write parameters

If a rising edge is applied to the "Cmd\_Start\_write" input of the module, then all parameters will be transferred to the drive. 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 drive.

#### 3.7.4 Copy parameters from read to write

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

#### 3.7.5 S-Commands

After executing a S-Command a read cycle must be triggered manually to refresh all actual values (`_r`).

### 3.7.6 Counter value

Count read value	Count write value	Name	Value range (dec)	Default
1	1	LED Functionality	0 ... 1	0
2	2	Service Interface Baudrate	0 ... 3	1
3	3	Digital Output 1 Functionality	0 ... 3	0
4		Digital Output Functionalities State		-
5	4	Digital Outputs Polarity	0 ... 15	0
6	5	Digital Input 1 Functionality	0 ... 11	0
7	6	Digital Input 2 Functionality	0 ... 11	0
8	7	Digital Input 3 Functionality	0 ... 11	0
9	8	Digital Input 4 Functionality	0 ... 11	0
10		Digital Input Functionalities State		-
11	9	Digital Inputs Polarity	0 ... 15	0
12	10	Controller Parameter P	1 ... 500	300
13	11	Controller Parameter I	0 ... 500	2
14	12	Controller Parameter D	0 ... 500	0
15	13	A-Pos	1 ... 100	50
16	14	V-Pos	Gear 66:1 ⇒ 1 ... 75 rpm 98:1 ⇒ 1 ... 50 rpm 188:1 ⇒ 1 ... 30 rpm 368:1 ⇒ 1 ... 15 rpm	10
17	15	D-Pos	1 ... 101	101
18	16	A-Rot	1 ... 100	50
19	17	A-Inch	1 ... 100	50
20	18	V-Inch	Gear 66:1 ⇒ 1 ... 75 rpm 98:1 ⇒ 1 ... 50 rpm 188:1 ⇒ 1 ... 30 rpm 368:1 ⇒ 1 ... 15 rpm	10
21	19	Pos Window	0 ... 1000	10
22	20	Gear Ratio Numerator	1 ... 10000	1
23	21	Gear Ratio Denominator	1 ... 10000	1
24	22	Spindle Pitch	0 ... 1000000	0
25	23	Calibration Value	-999999 ... 999999	0
26	24	Software Limit 1	-9999999 ... 9999999	99999
27	25	Software Limit 2	-9999999 ... 9999999	-19999
28	26	Delta Inch	-1000000 ... 1000000	720
29	27	Sense of Rotation	0 ... 1	0
30	28	Pos Type	0 ... 2	0
31	29	Operating Mode	0 ... 1	0
32	30	Inching 2 Stop Mode	0 ... 1	0

Count read value	Count write value	Name	Value range (dec)	Default
33	31	Inpos Mode	0 ... 2	0
34	32	Loop Length	0 ... 30000	360
35	33	Contouring Error Limit	1 ... 30000	400
36	34	Current Limiting	25 ... 110	110
37	35	Inching 2 Offset	10 ... 100	100
38	36	Inching 2 Acceleration Type	0 ... 1	0
39	37	Offset Value	-999999 ... 999999	0
40	38	PCM Position 1	DINT	0
41	39	PCM Position 2	DINT	0
42	40	PCM Position 3	DINT	0
43	41	PCM Position 4	DINT	0
44	42	PCM Position 5	DINT	0
45	43	PCM Position 6	DINT	0
46	44	PCM Position 7	DINT	0
47	45	PCM Acceleration 1	1 ... 100	50
48	46	PCM Acceleration 2	1 ... 100	50
49	47	PCM Acceleration 3	1 ... 100	50
50	48	PCM Acceleration 4	1 ... 100	50
51	49	PCM Acceleration 5	1 ... 100	50
52	50	PCM Acceleration 6	1 ... 100	50
53	51	PCM Acceleration 7	1 ... 100	50
54	52	PCM Velocity 1	Gear 66:1 ⇒ 1 ... 75 rpm 98:1 ⇒ 1 ... 50 rpm 188:1 ⇒ 1 ... 30 rpm 368:1 ⇒ 1 ... 15 rpm	10
55	53	PCM Velocity 2	see PCM Velocity 1	10
56	54	PCM Velocity 3	see PCM Velocity 1	10
57	55	PCM Velocity 4	see PCM Velocity 1	10
58	56	PCM Velocity 5	see PCM Velocity 1	10
59	57	PCM Velocity 6	see PCM Velocity 1	10
60	58	PCM Velocity 7	see PCM Velocity 1	10
61	59	PCM Deceleration 1	1 ... 101	101
62	60	PCM Deceleration 2	1 ... 101	101
63	61	PCM Deceleration 3	1 ... 101	101
64	62	PCM Deceleration 4	1 ... 101	101
65	63	PCM Deceleration 5	1 ... 101	101
66	64	PCM Deceleration 6	1 ... 101	101
67	65	PCM Deceleration 7	1 ... 101	101
68		Output Stage Temperature		-
69		Voltage of Control		-



Count read value	Count write value	Name	Value range (dec)	Default
70		Voltage of Output Stage		-
71		Voltage of Battery		-
72		Motor Current		-
73		Actual Position		-
74		Actual Rotational Speed		-
75		Serial Number		-
76		Production Date		-
77		SW Motor Controller		-
78		Gear Reduction		-
79		System Status Word		-
80		Encoder Resolution		-
81		Device ID		-
82		Number of Errors		-
83		Error Number 1		-
84		Error Number 2		-
85		Error Number 3		-
86		Error Number 4		-
87		Error Number 5		-
88		Error Number 6		-
89		Error Number 7		-
90		Error Number 8		-
91		Error Number 9		-
92		Error Number 10		-
	66	S Command	0 ... 8	0

### 3.7.7 Error codes

The "status" output parameter contains error information. If it is interpreted as ARRAY[1...4] OF BYTE , the error information has the following structure:

Field element	Name	Meaning
status[1]	Function_Num	B#16#00, if no error Function ID from DPV1-PDU: If an error occurs, B#16#80 will be output (for read data record: B#16#DE, for write data record: B#16#DF). If no DPV1 protocol element is used: B#16#C0
status[2]	Error Decode	Location of the error ID
status[3]	Error_Code_1	Error ID
status[4]	Error_Code_2	Manufacturer-specific error ID extension

### 3.7.7.1 Field element status[2]

status[2] can have the following values:

Error Decode (B#16#...)	Source	Meaning
00 to 7F	CPU	No error or no warning
80	DPV1	Error according to IEC 61158-6
81 to 8F	CPU	B#16#8x shows an error in the xth call parameter of the instruction
FE, FF	DP profile	Profile-specific error

## 3.7.7.2 Field element status [3]

Error_Decode (B#16#...)	Error_Code_1 (B#16#...)	Explanation according to DPV1	Meaning
00	00		No error, no warning
70	00	reserved, reject	Initial call; no active data record transfer
70	01	reserved, reject	Initial call; data record transfer has started
70	02	reserved, reject	Intermediate call; data record transfer already active
80	90	reserved, pass	Invalid logical start address
80	92	reserved, pass	Illegal type for ANY pointer
80	93	reserved, pass	The DP component addressed via ID or F_ID is not configured
80	95		Error when reading additional interrupt information (when reading out additional interrupt information for central or distributed I/O via an external DP interface, this error will be output as a "group error".) Note: During link-up and update, the additional interrupt information may not be available temporarily.
80	96		The master CPU is in STOP mode. At that time, an OB was being processed. The instruction "RALRM" cannot supply the OB start information, the management information, the header information, or the additional interrupt information. The OB start information can be read with the "RD_SINFO" instruction. In addition, you can use the "DPNRM_DG" instruction to asynchronously read the current diagnostics frame of the affected DP slave for OBs 4x, 55, 56, 57, 82, and 83 (address information from the OB start information).
80	A0	read error	Negative acknowledgment while reading the module.
80	A1	write error	Negative acknowledgement when writing to the module
80	A2	module failure	DP protocol error at layer 2 (e.g., slave failure or bus problems)
80	A3	reserved, pass	PROFIBUS DP: DP protocol error with Direct-Data-Link-Mapper or User-Interface/User  PROFINET IO: General CM error

Error Decode (B#16#...)	Error_Code_1 (B#16#...)	Explanation according to DPV1	Meaning
80	A4	reserved, pass	Communication on the communication bus disrupted
80	A5	reserved, pass	-
80	A7	reserved, pass	DP slave or module is occupied (temporary error)
80	A8	version conflict	DP slave or module reports non-compatible versions
80	A9	feature not supported	Function is not supported by DP slave or module
80	AA to AF	user specific	DP slave or module reports a manufacturer-specific error in its application. Please check the documentation from the manufacturer of the DP slave or module.
80	B0	invalid index	Data record not known in module Illegal data record number $\geq 256$
80	B1	write length error	The length specified in the RECORD parameter is incorrect;  With "RALRM": length error in AINFO,  With "RDREC" and "WRREC": length error in MLEN
80	B2	invalid slot	The configured slot is not occupied.
80	B3	type conflict	Actual module type does not match specified module type
80	B4	invalid area	DP slave or module reports access to an invalid area
80	B5	state conflict	DP slave or module not ready
80	B6	access denied	DP slave or module denies access
80	B7	invalid range	DP slave or module reports an invalid range for a parameter or value
80	B8	invalid parameter	DP slave or module reports an invalid parameter
80	B9	invalid type	DP slave or module reports an invalid type  With "RDREC": buffer too small (subsets cannot be read)  With "WRREC": buffer too small (subsets cannot be written)

Error_Decode (B#16#...)	Error_Code_1 (B#16#...)	Explanation according to DPV1	Meaning
80	BA to BF	user specific	<p>DP slave or module reports a manufacturer-specific error when accessing. Please check the documentation from the manufacturer of the DP slave or module.</p> <p>Note on value B#16#BA: The following applies for PROFINET in the H system: If a data record job with the return value W#16#80BA is rejected, the job must be repeated.</p>
80	C0	read constrain conflict	<p>With "WRREC": the data can only be written when the CPU is in STOP mode. Note: this means that writing by the user program is not possible. You can only write the data online with PG/PC.</p> <p>With "RDREC": the module routes the data record, but either no data is present or the data can only be read when the CPU is in STOP mode. Note: if data can only be read when the CPU is in STOP mode, then an evaluation by the user program is not possible. In this case, you can only read the data online with PG/PC.</p>
80	C1	write constrain conflict	The data of the previous write job on the module for the same data record have not yet been processed by the module.
80	C2	resource busy	The module is currently processing the maximum possible number of jobs for a CPU.
80	C3	resource unavailible	The required operating resources are currently occupied.
80	C4		<p>Internal temporary error. Job could not be carried out.</p> <p>Repeat the job. If this error occurs often, check your installation for sources of electrical interference.</p>
80	C5		DP slave or module not available.
80	C6		Data record transfer was canceled due to priority class cancellation
80	C7		Job aborted due to warm or cold restart on the DP master

Error_Decode (B#16#...)	Error_Code_1 (B#16#...)	Explanation according to DPV1	Meaning
80	C8 to CF		DP slave or module reports a manufacturer-specific resource error. Please check the documentation from the manufacturer of the DP slave or module.
80	Dx	user specific	DP slave specific. Refer to the description of the DP slave.
8x (x=1, ... 9,A,B,C,D,E,F)	00 to FF		Error in y-th call parameter (y = 1, ...15)  Error_Code_1 = 00: Illegal operating mode  For all other values of Error_Code_1 refer also to: Evaluating errors with output parameter RET_VAL
FE, FF	00 to FF		Profile-specific error

### 3.7.7.3 Field element status [4]

In PROFINET IO, status[4] has the value 0