Installation and configuration manual

gamma/ X with PROFIBUS®
Function blocks

EN

FB PROFIBUS®

Please carefully read these operating instructions before use. · Do not discard.
The operator shall be liable for any damage caused by installation or operating errors.
The latest version of the operating instructions are available on our homepage.

Part no. 983500

BA G 050 06/16 EN

Table of contents

1 Installation of the GSD file in Step 7 Manager

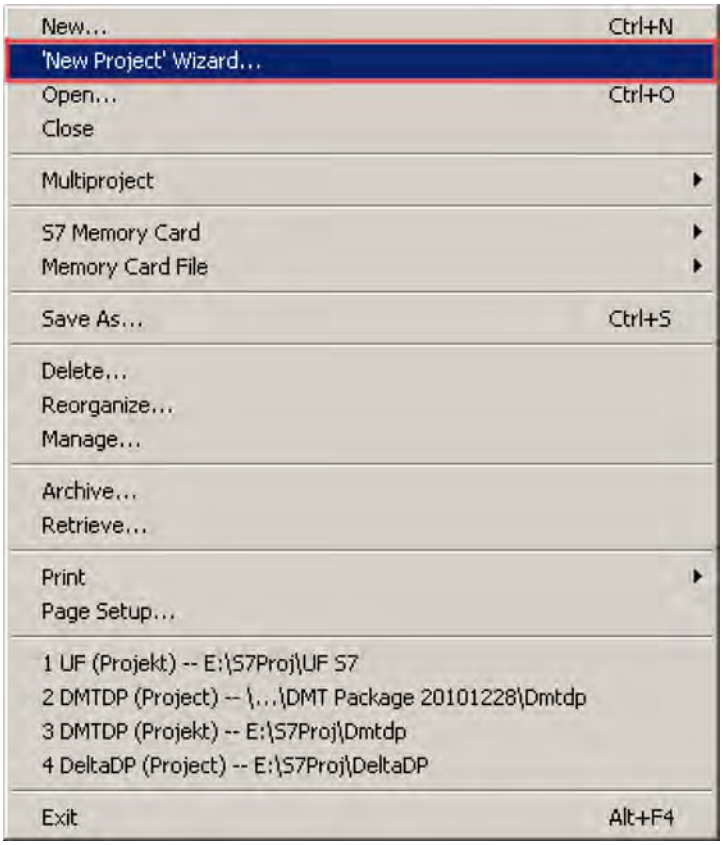
This installation manual is only for persons who are familiar with the Siemens Simatic S7 PLC.

Prerequisites:

The installation package (such as “Delta_S7_function_block” or Gamma-Sigma_S7_function_block”), with the GSD file (such as prom0B02.gsd”) must have been downloaded from the *www.prominent.com* website. (The installation package for the respective product is there.)

The installation package must be open on the PC and the GSD must be copied from the installation package into a folder.

1.1 Creating a project

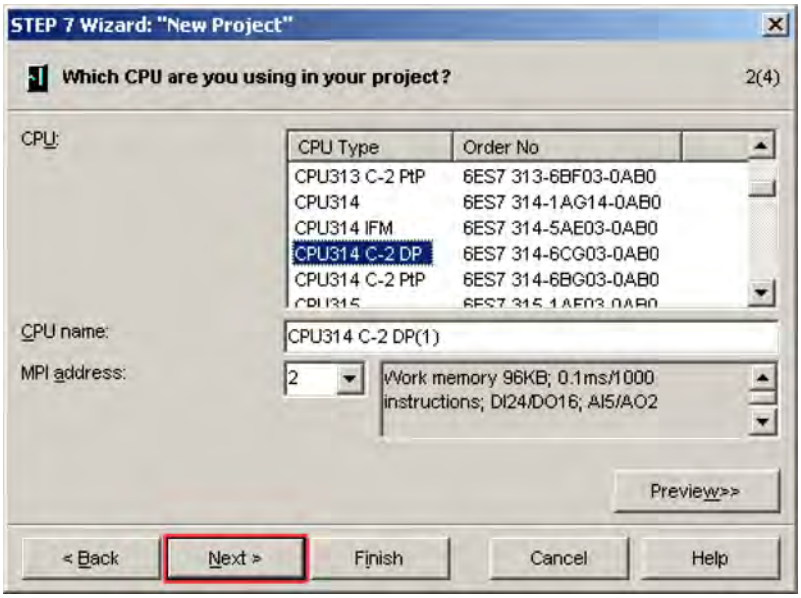


1. Follow the path *'File* ➔ *'New Project' Wizard...'* and click with the mouse.

   ⇨ The *'Introduction'* window will be displayed:

2. Click the *[Next>]* button.

   ⇨ The window *'Which CPU are you using in your project?'* will be displayed:

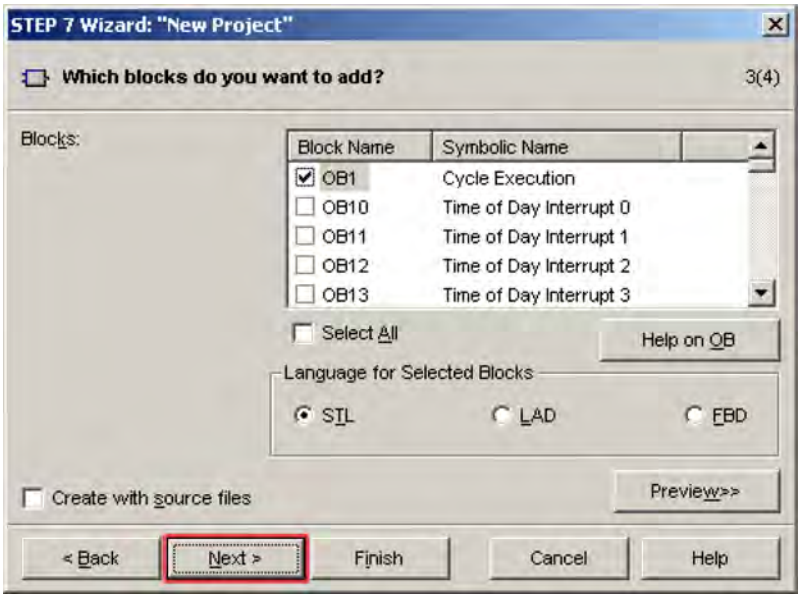


3. Select the correct CPU.

When selecting the correct CPU the software version that is imprinted on the CPU and the order number help.

Click the *[Next>]* button.

⇨ The window *'Which blocks do you want to add?'* will be displayed:



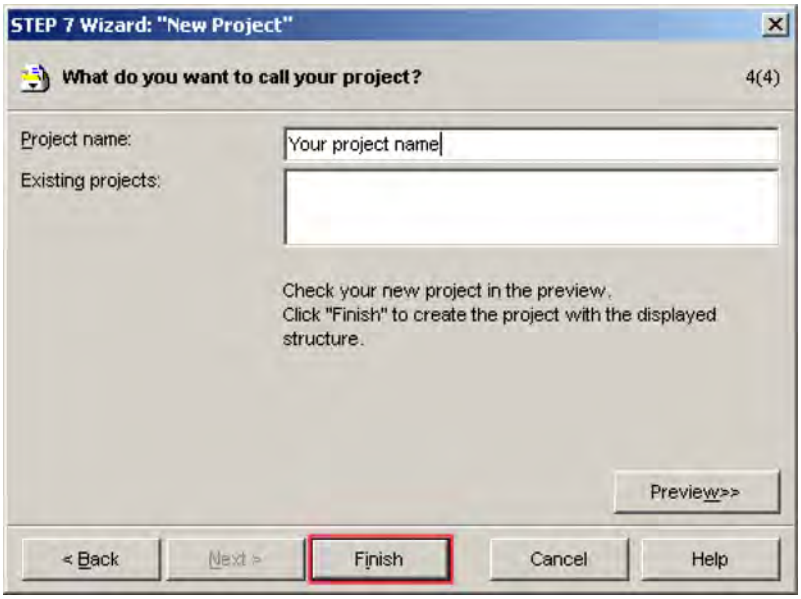
4. Always place a check mark for option block OB1.

5. If the function will be called in selectable time intervals, in addition select OB35 with a check mark (the operation blocks can vary depending on CPU).

A more precise description of the performance scope of the CPU is in your operating manual.

6. Click the *[Next>]* button.

   ⇨ The window *'What do you want to call your project?'* will be displayed:



7. After a project name has been entered (in this case “Profibus_Delta”), click the *[Finish]* button.

   ⇨ The Simatic Manager window will open - see the following chapter.

1.2 Install GSD file

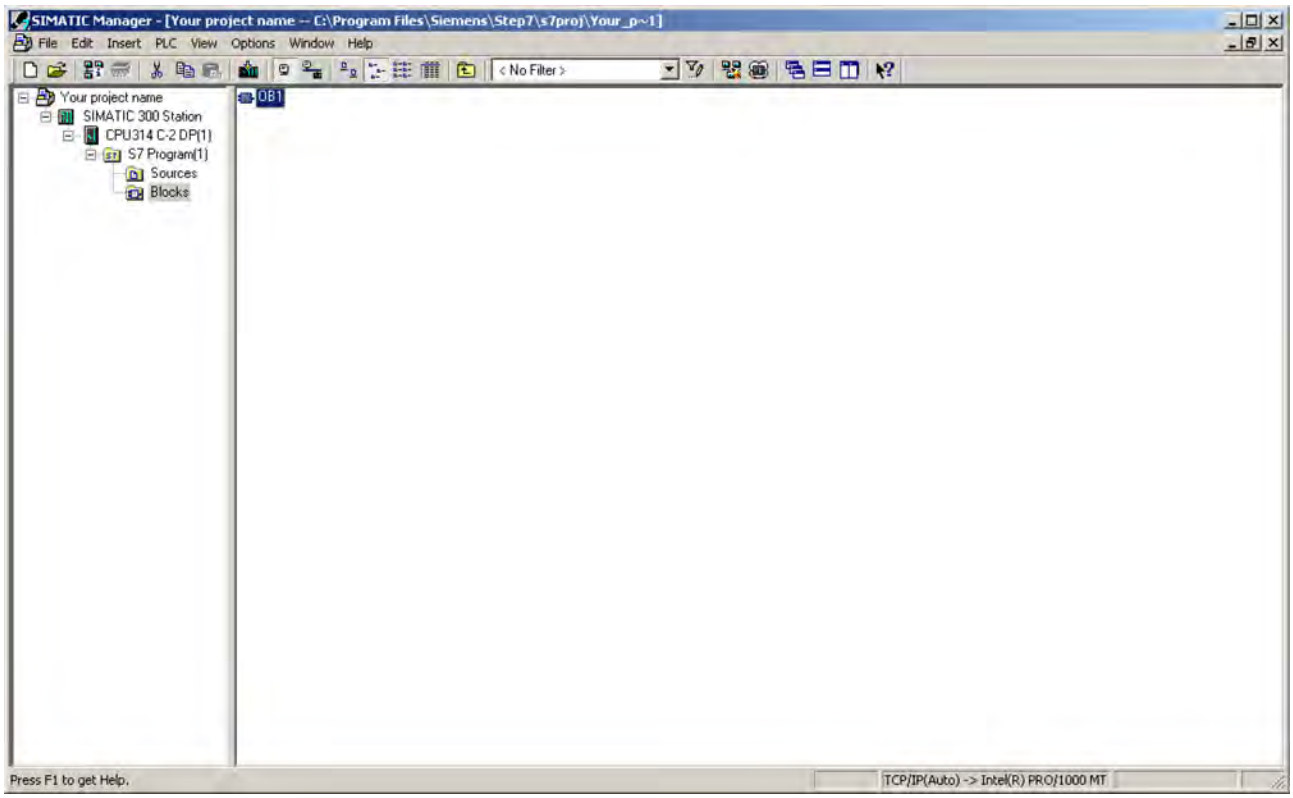


Fig. 1: Simatic Manager with main window with navigation bar

1. In Simatic Manager, in the navigation bar (left) select *'Simatic 300 Station'*.

   ⇨ In the main window a symbol *'Hardware'* is displayed.

2. Double click the *'Hardware'* symbol.

   ⇨ The Hardware Configurator will open:

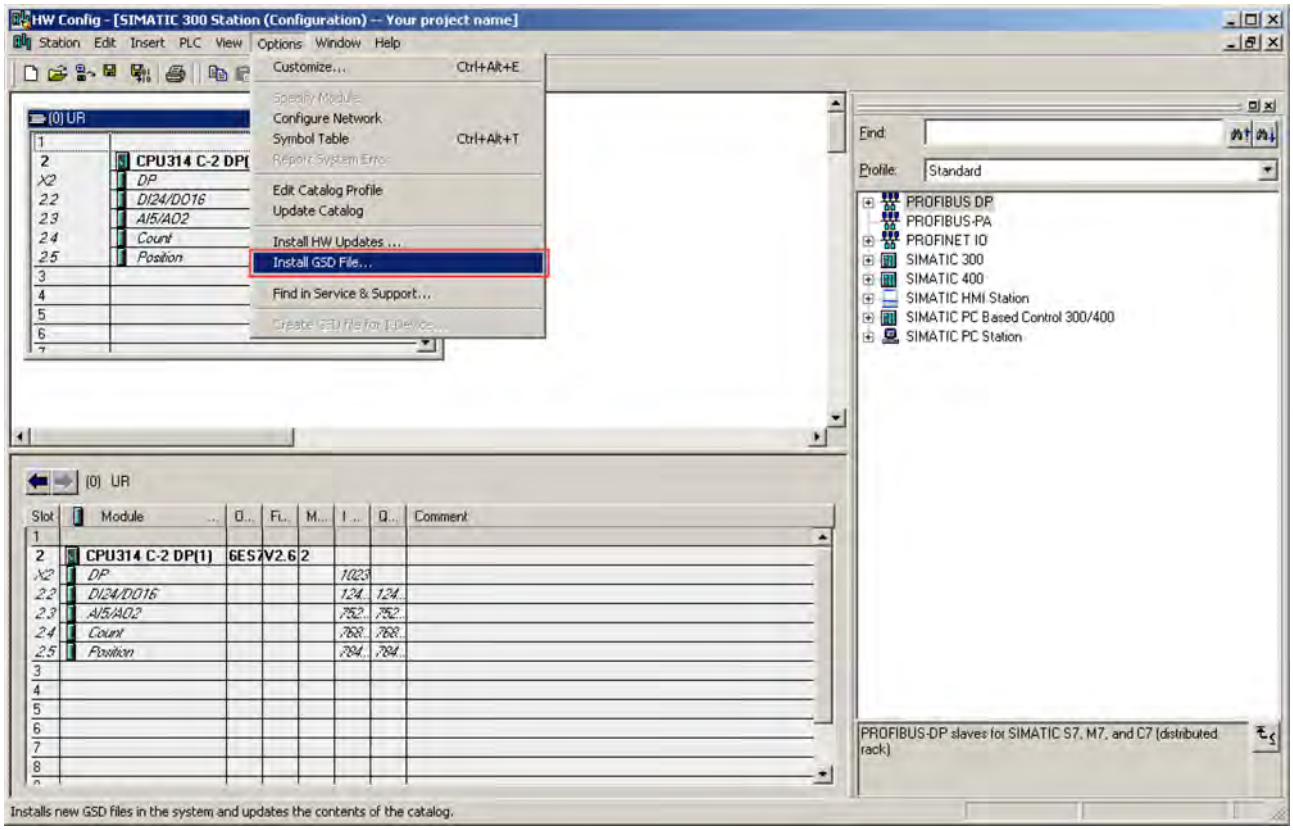
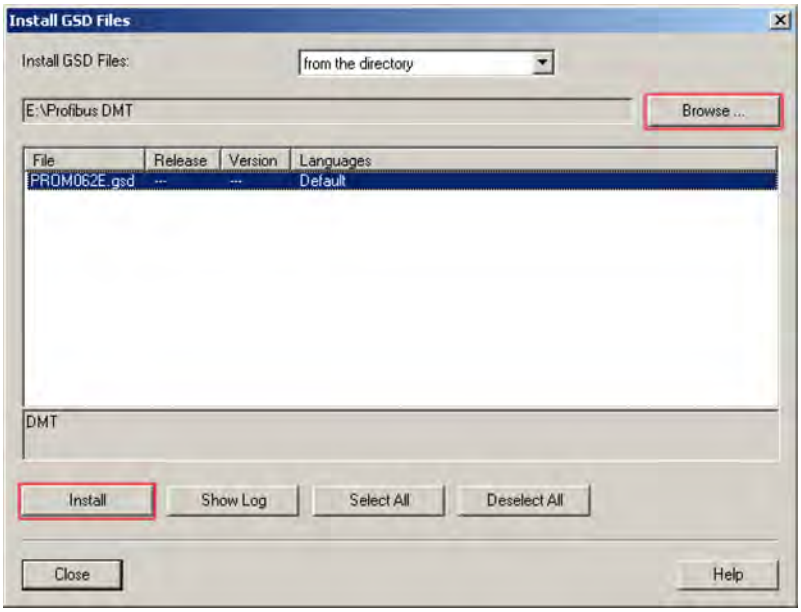


Fig. 2: The Hardware Configurator

3. Follow the path *'Options* ➔ *Install GSD File'* and click with the mouse.

   ⇨ The *'Install GSD File'* window will open:

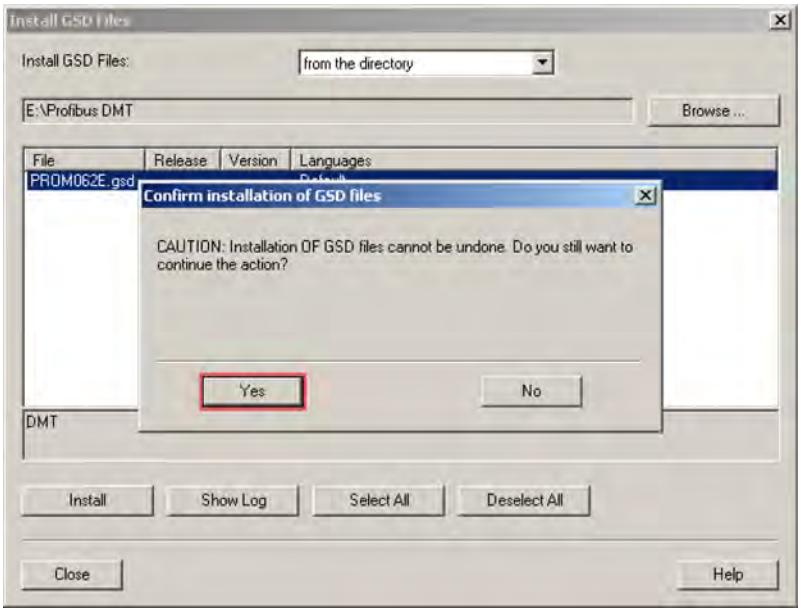


4. Use the *[Browse]* button to select the folder into which you have copied the GSD file. (In this screenshot the folder "Profibus Delta" is on drive "E:").

5. If the path was correct, the GSD file will be displayed in the window. In this screenshot, this is the file “PROM0B02.gsd” for the delta (for gamma/ L or Sigma it would be the file “PROM0596.gsd”).

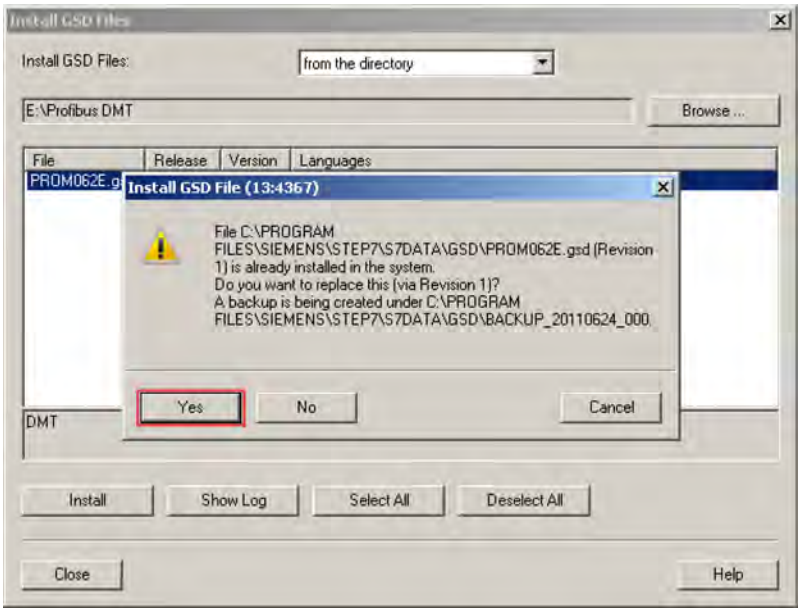
6. Select the file and press the *[Install]* button.

   ⇨ A warning will be displayed stating that the action cannot be undone:

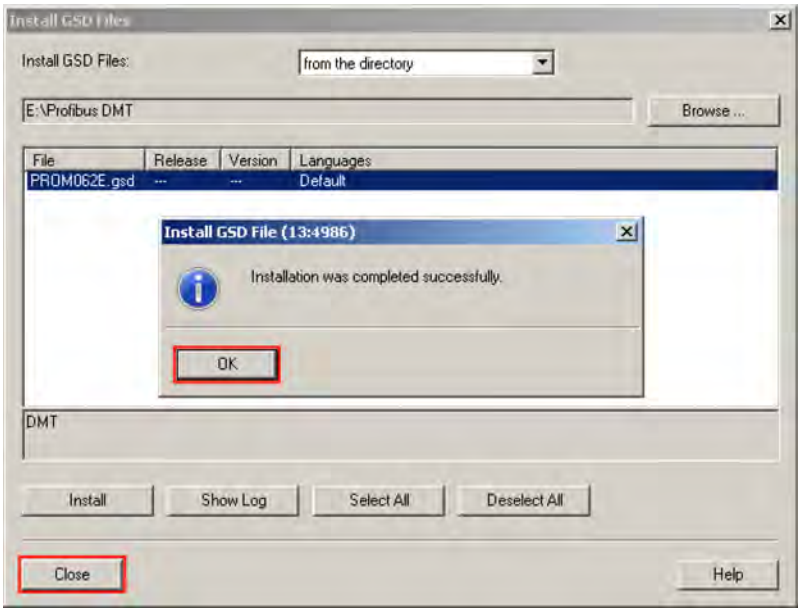


7. Click *[Yes]*.

   ⇨ If this GSD file is already present, the following message will be displayed:



8. Click *[Yes]* to install the GSD file.
   ⇨ The following message will be displayed:



9. Click *[OK]* to conclude the installation.
10. Click *[Close]* to close the window.

The next chapter shows how you can integrate the ProMinent device (pump, measuring transducer, etc.) into your own project.

2 Integrating the device and the function block into your own project.

Please note: This description cannot go into all the details of PROFIBUS® communication.

If necessary attend an appropriate training course.

2.1 Add PROFIBUS® Master System

This section describes how to add a PROFIBUS® Master System into your own project and how to generate a PROFIBUS® subnet:

1. Double click to open your own project (shown here with a red border) that you created in chapter 1.1:

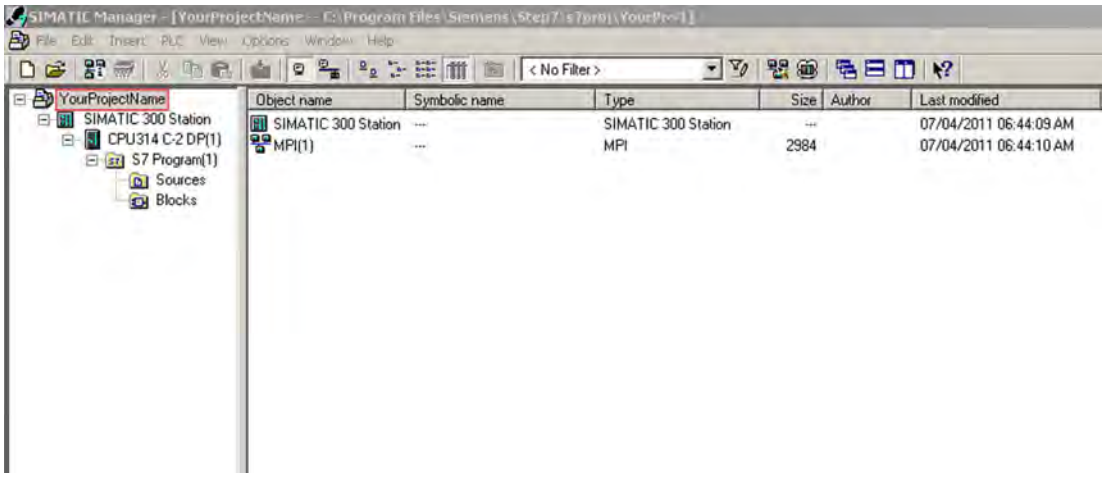


Fig. 3

2. Double click the *'Hardware'* symbol to open the Hardware Configurator:

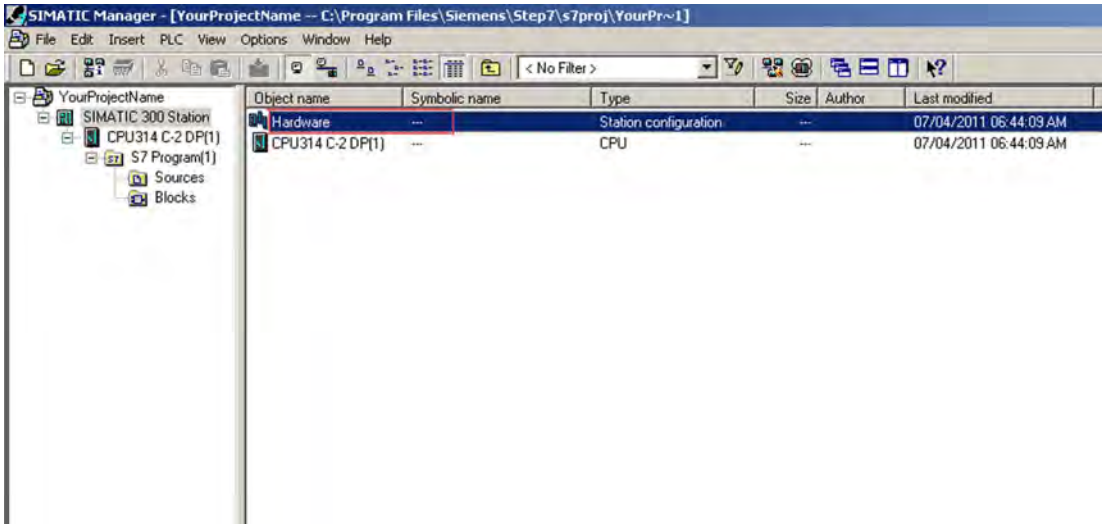


Fig. 4

3. Add a Master System for the CPU: For example, for CPU 314C-2DP, right click slot X2 “DP”.

   ⇨ The context menu will open:

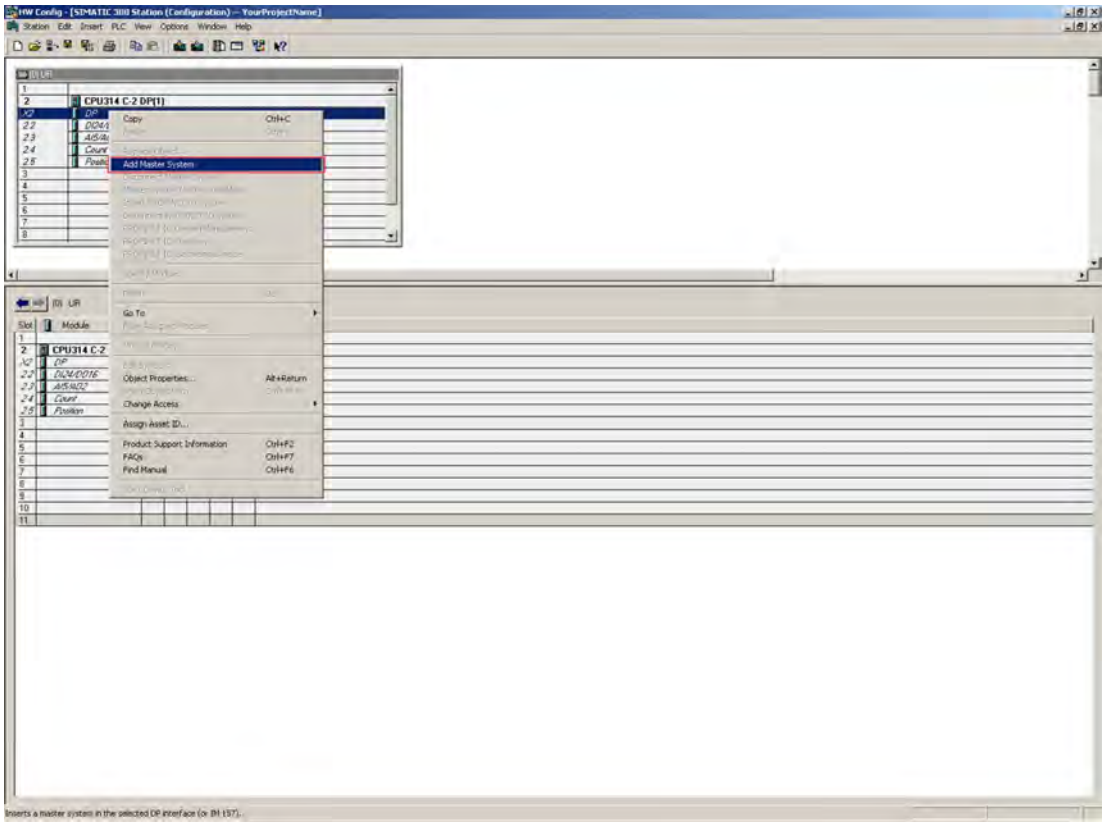


Fig. 5

4. Here select *‘Add Master System’*.

   ⇨ The window *‘PROFIBUS Interface DP’* will be displayed:

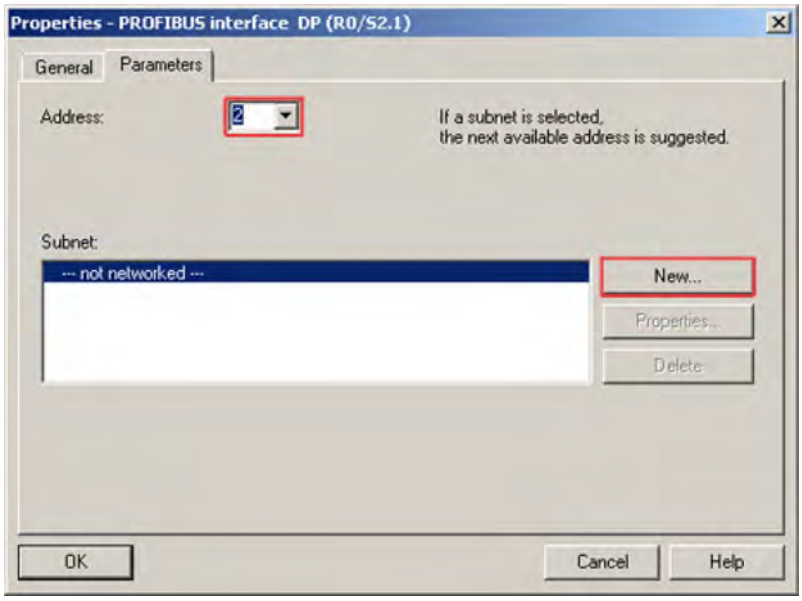


Fig. 6

5. In the *‘Parameters’* tab under *‘Address’* enter the PROFIBUS® address of the CPU used.

6. Click *[New]*.

⇨ The *'New Subnet PROFIBUS'* will be displayed:

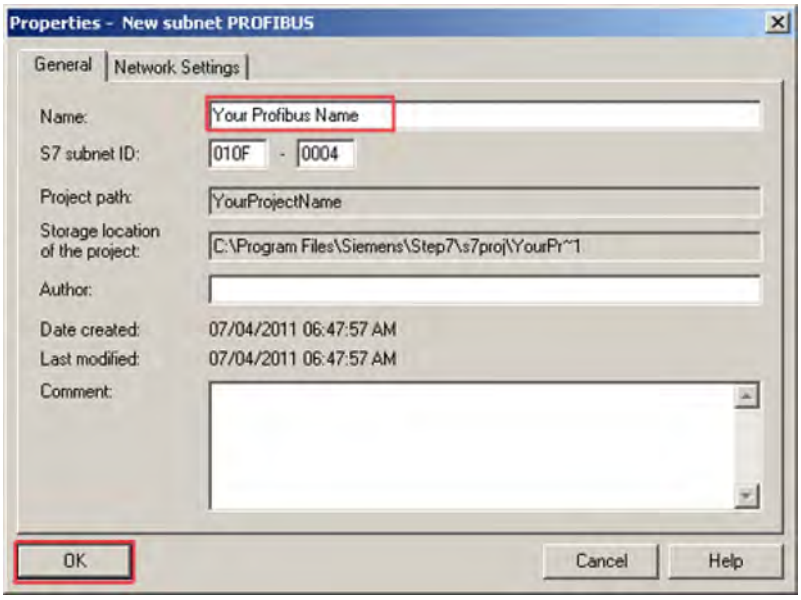


Fig. 7

7. Under *'Name'* enter a name for the subnet of the PROFIBUS and click *[OK]*.

⇨ The window *'PROFIBUS Interface DP'* will be displayed again:

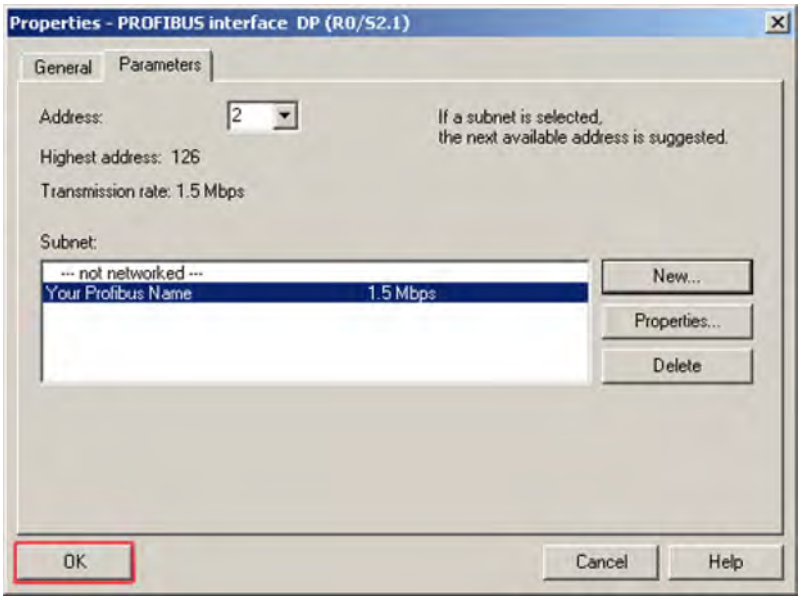


Fig. 8

8. (If necessary via *'Properties'* special PROFIBUS® parameters can be adjusted.)

9. Mark the PROFIBUS® subnet and click *[OK]*.

   ⇨ The Hardware Configurator connects the CPU (the Master System) with the Subnet of the PROFIBUS®, which the Hardware Configurator now displays in this manner:

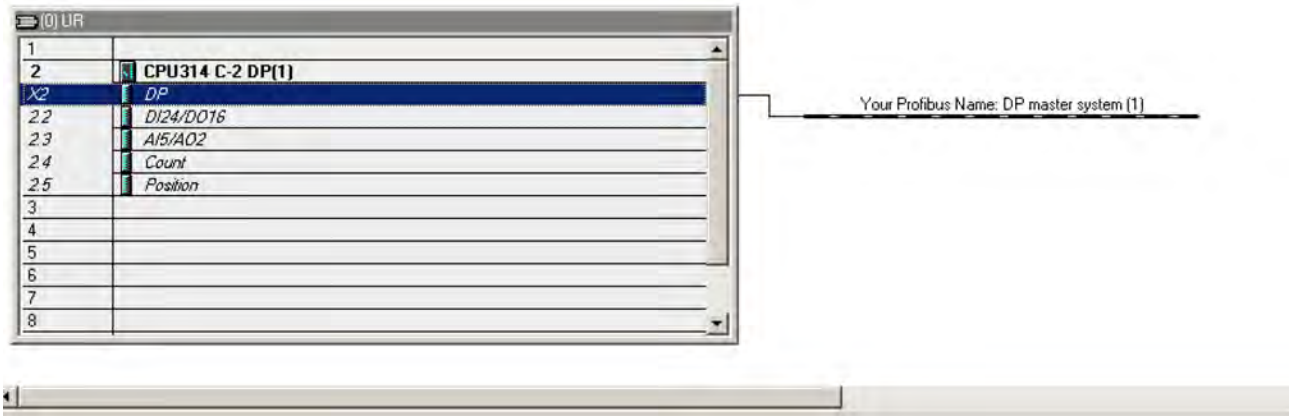


Fig. 9: Graphic presentation: Connection CPU (Master System) with the subnet of the PROFIBUS® in the Hardware Configurator (excerpt)

2.2 Connecting the device to the PROFIBUS® Master System

As soon as the PROFIBUS® master system has been added to the project and the PROFIBUS® subnet is created, the gamma/ X metering pump can be connected to the PROFIBUS®:

1. Call up the catalogue via *'Tools ➔ Display Catalogue'*.

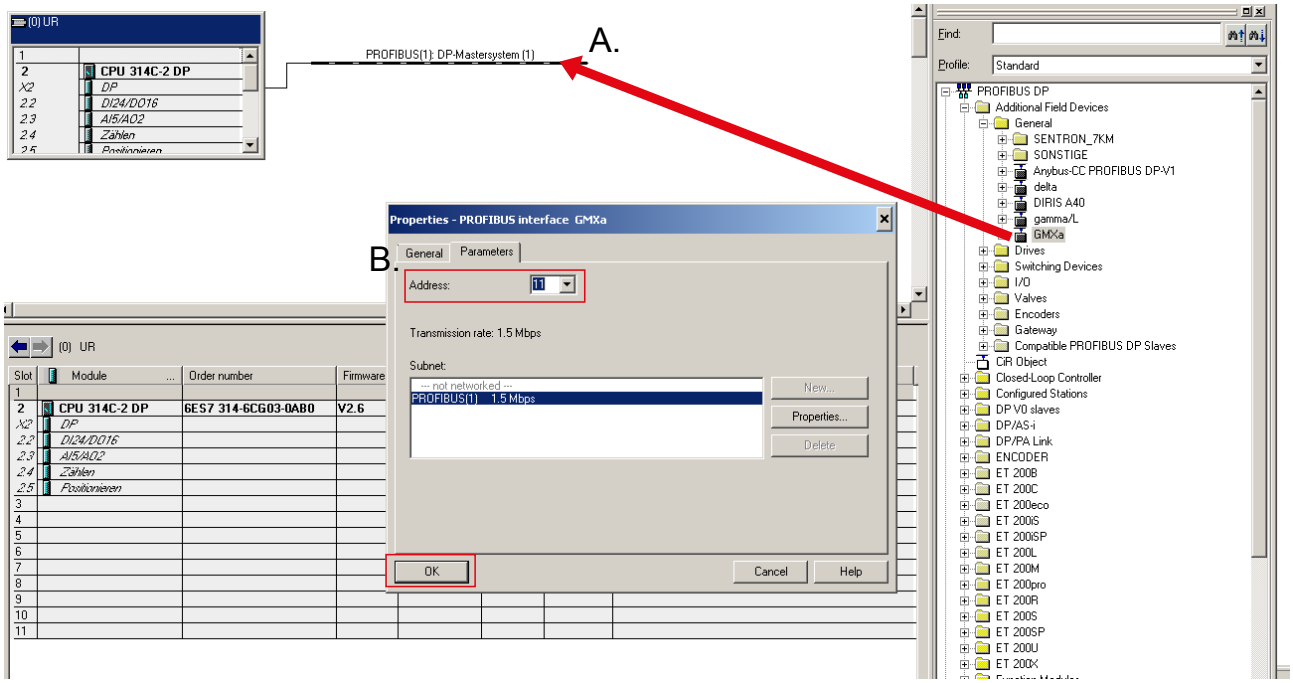
   ⇨ To the right in the window you will see:

2. Select the file *'GMXa'* under *'Profibus-DP ➔ Additional Field Devices ➔ General'*.

If the entry is not present, the GSD file is not correctly installed.

3. Drag the *'GMXa'* file with the mouse to the Master System (A.) - see the orange arrow in the screenshot below.

⇨ A small "+" will appear as soon as the cursor is on "Your name PROFIBUS DP Master System".

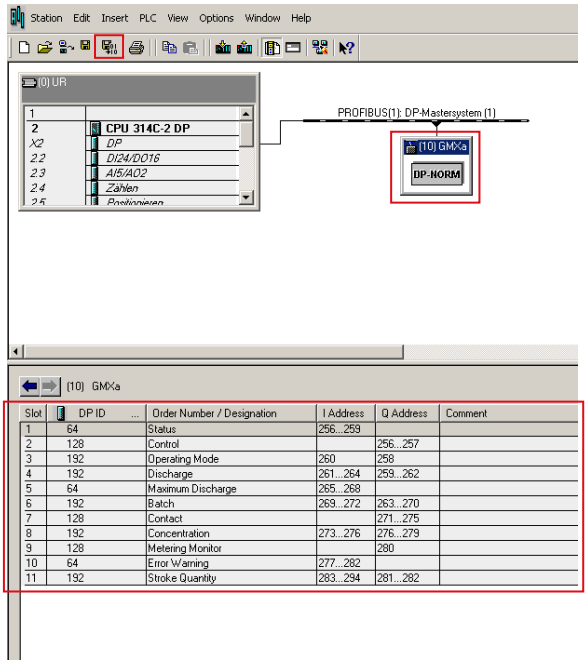


4. Release the mouse button to display a pop-up window (B.) - see illustration above.

5. Under *'Address'* set the PROFIBUS® address that is set on your gamma/ X - see supplemental instructions for gamma/ X with PROFIBUS® - and click *[OK]*.

> *If this address is not displayed (already assigned), enter a new address. Then enter this address on your actual gamma/ X as well.*

⇨ The Hardware Configurator will then connect the gamma/ X to the PROFIBUS® Master System (red box, right) via the subnet, which the Hardware Configurator displays in this manner:



Slot	DP ID	Order Number / Designation	I Address	Q Address	Comment
1	64	Status	256...259		
2	128	Control		256...257	
3	192	Operating Mode	260	258	
4	192	Discharge	261...264	259...262	
5	64	Maximum Discharge	265...268		
6	192	Batch	269...272	263...270	
7	128	Contact		271...275	
8	192	Concentration	273...276	276...279	
9	128	Metering Monitor		280	
10	64	Error Warning	277...282		
11	192	Stroke Quantity	283...294	281...282	

Fig. 10: Connection Master System to the gamma/ X via the subnet (graphic presentation in the Hardware Configurator)

In the lower window area (red box) the individual slots and their I-addresses and O-addresses (input addresses and output addresses) are displayed.

6. If necessary, adjust the I-address ranges and O-address ranges. To do this double-click on the appropriate row.

⇨ A window will open.

7. Here, enter the desired, changed address range and click *[OK]*.

> *The Hardware Configurator will supplement the address range automatically.*
>
> *The Hardware Configurator prevents the address from being assigned twice. It handles I-addresses and O-addresses separately.*

8. Save the addresses via the special diskette symbol with “0110” in the toolbar.

9. Close the Hardware Configurator.

2.3 Copying and linking GammaXBasic function block

The supplied function blocks are embedded in the ProMinent sample project “GammaXdp.zip”; this is the only way that they can be transported.

The principle steps:

1 - Download the zipped installation package (such as “GammaX_S7_Funktionsblock.zip”) from the website (prerequisite).

2 - Drag the ProMinent sample project “GammaXdp.zip” out of the installation package (prerequisite).

3 - Create a function in your own project (here FC1).

4 - Save the zipped ProMinent sample project “GammaXdp.zip” in the Simatic Manager and open it - in doing so, it will be simultaneously unzipped / retrieved.

5 - Copy the function block or the function blocks from this location into your own project.

6 - Link the required function block(s) into your own function (in this case FC1).

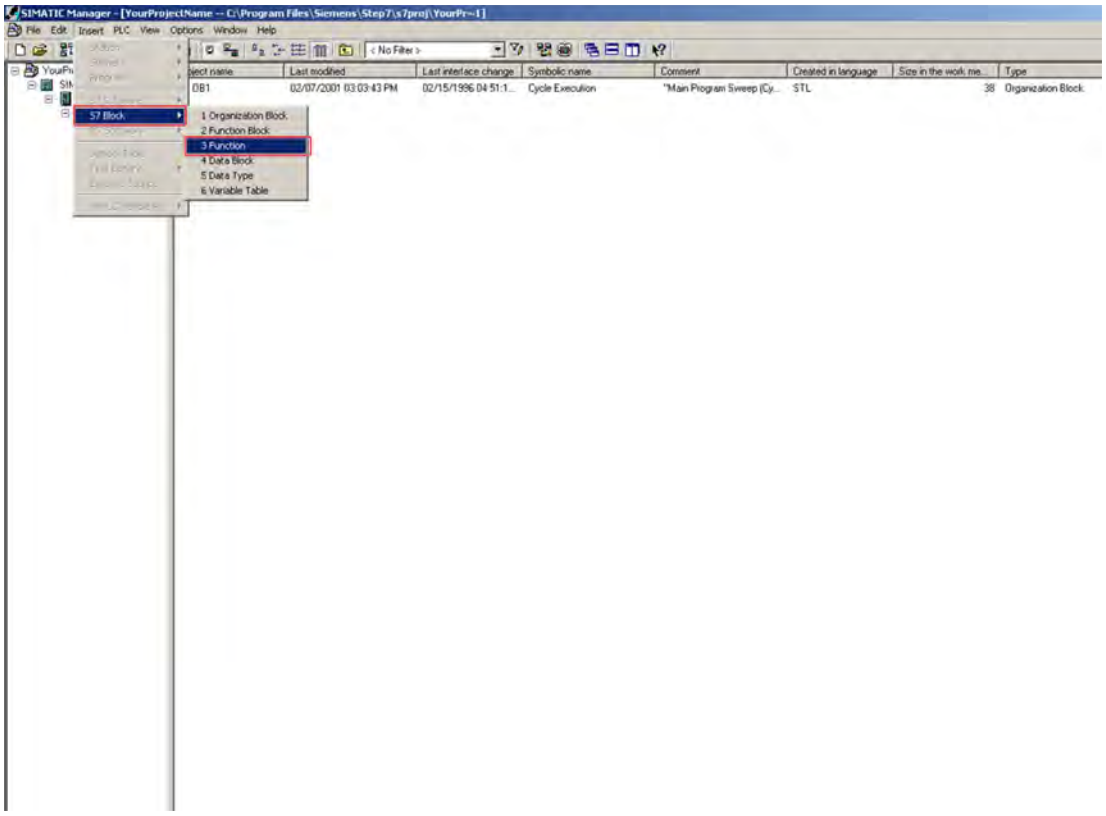
7 - Generate a data block.

8 - Enter the addresses in the function block.

9 - Enter the function parameters in the function block.

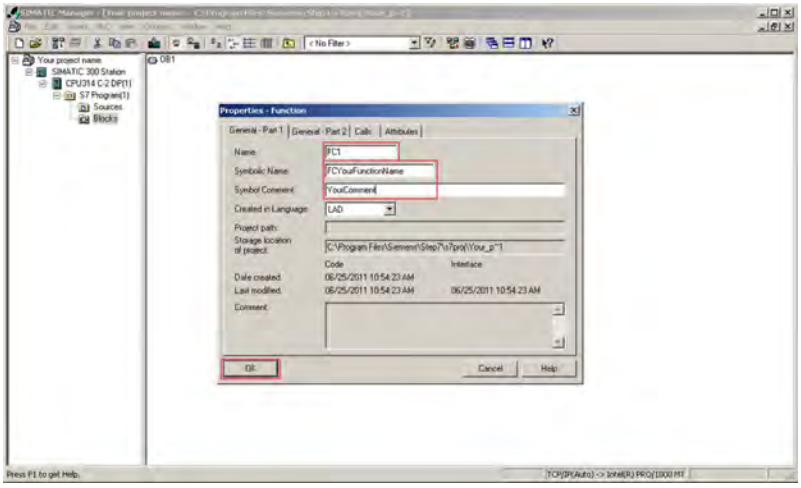
Copy the zipped ProMinent sample project "GammaXdp.zip" into a project and integrate it into a function:

1. In the Simatic Manager in the Navigation window, on the left, select *'Blocks'* and highlight it.



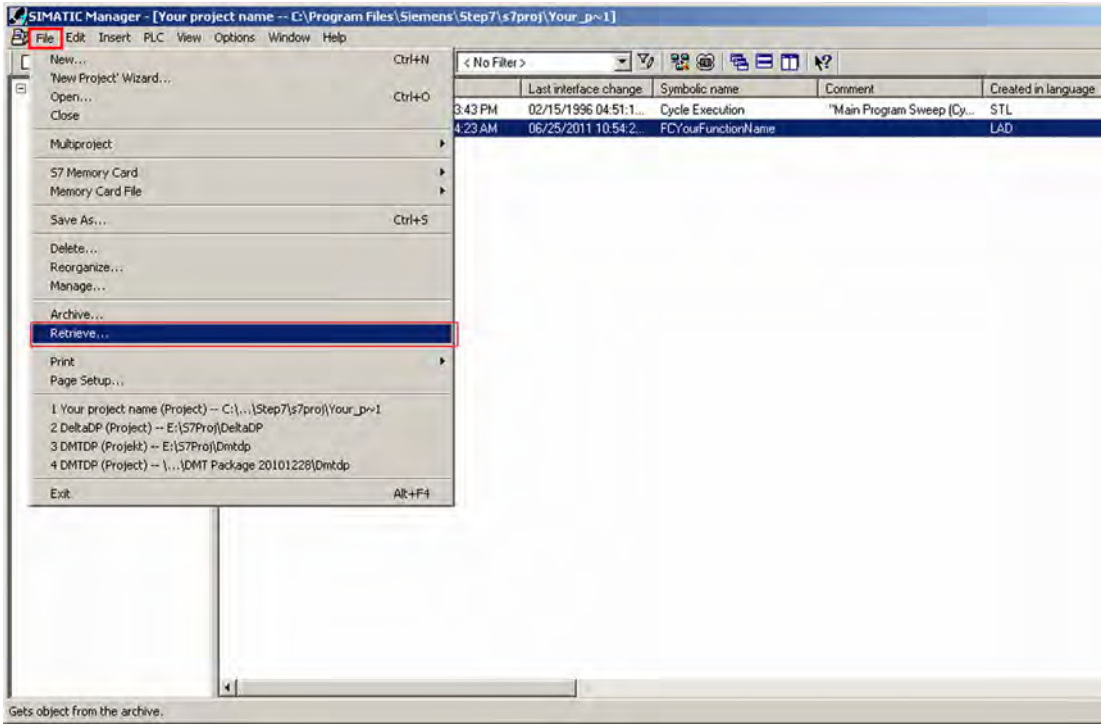
2. Follow the path *'Insert* ➔ *S7 Block* ➔ *3 Function'* and click with the mouse.

   ⇨ The window *'Properties - Function'* will open



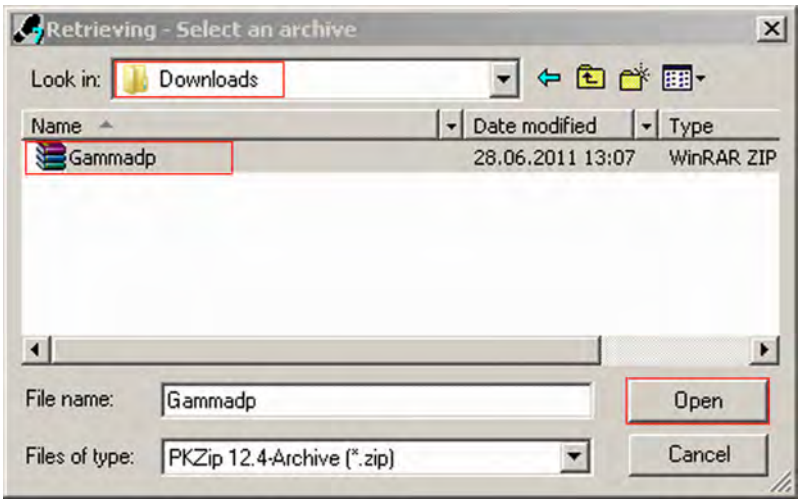
3. To create the function, here enter a *'Name'* (e.g. FC1) and a *'Symbolic name'* and under *'Symbol Comment'* enter its meaning. Then click *[OK]*.

   ⇨ In the main window the new function (e.g. FC1) will additionally be displayed.



1. Follow the path *'File ➔ Retrieve ...'* and click with the mouse.

⇨ The window *'Retrieving - Select an archive'* will be displayed:



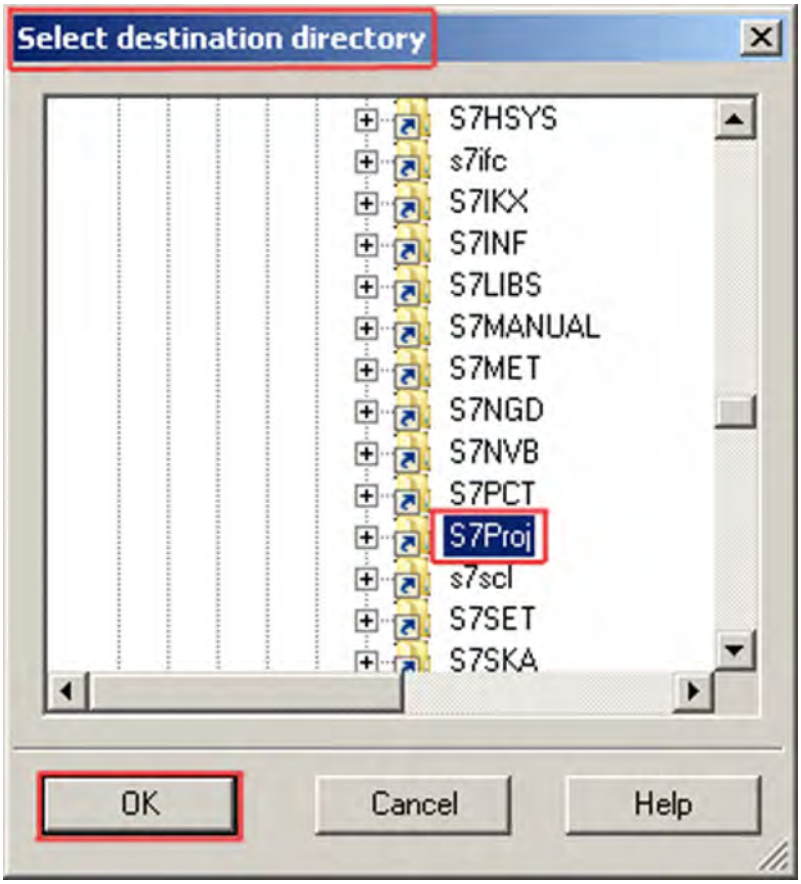
Archive = ZIP file

Archive = pack (zip)

Retrieve = unpack (unzip)

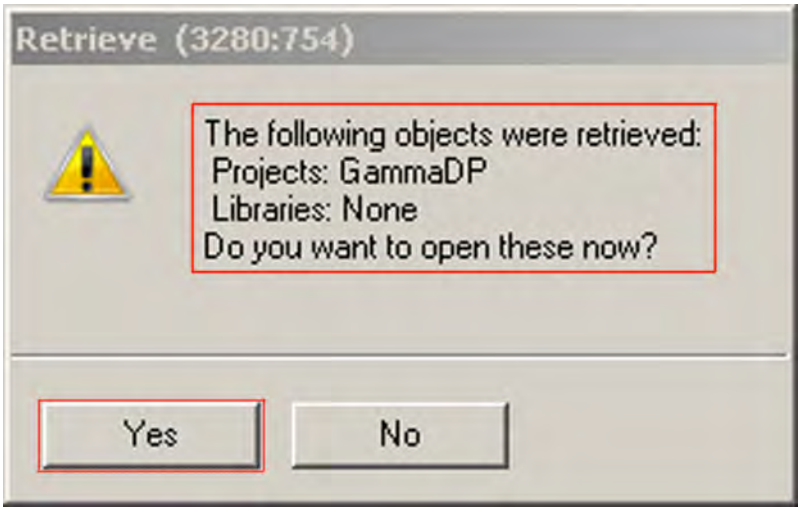
2. Here select your folder with the packed ProMinent sample project “GammaXdp”, and click *[Open]*.

   ⇨ The window *‘Select destination directory’* will be displayed.



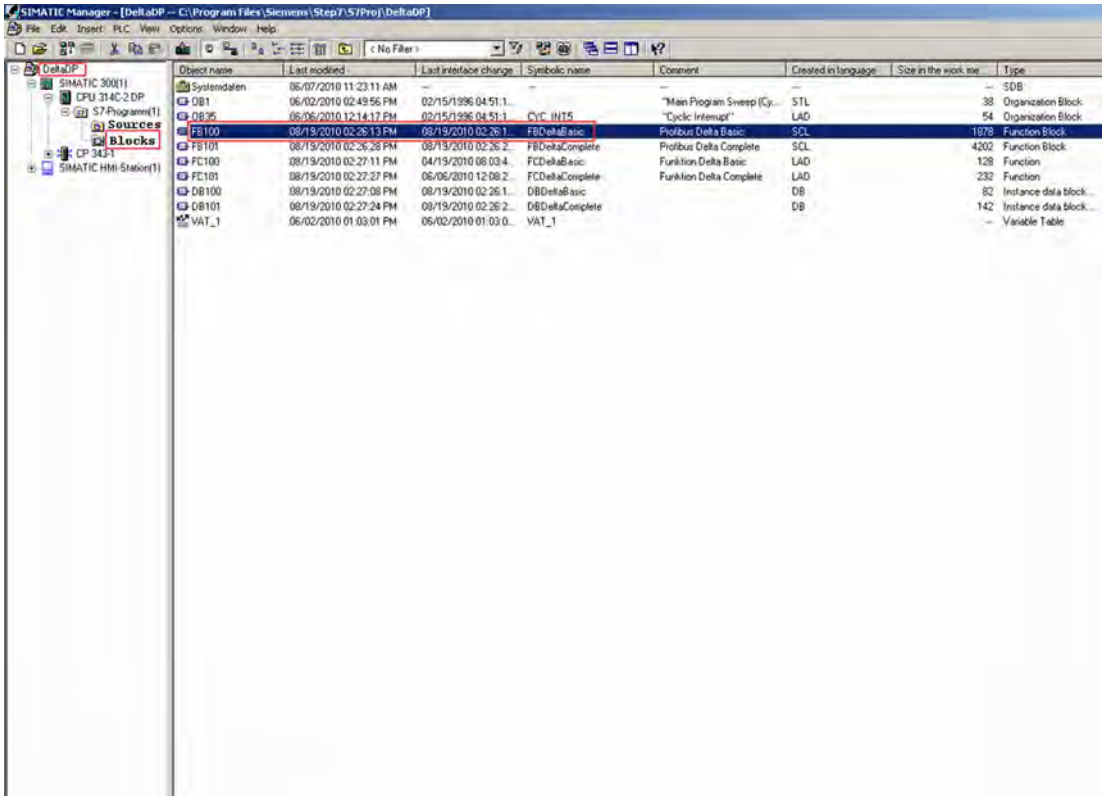
3. Here select the directory into which the ProMinent sample project will be unzipped, and click *[OK]*.

   ⇨ First a DOS Window (with black background) will be displayed, in which the ProMinent sample project will be unzipped. Then the *‘Retrieve’* window will be displayed:



4. To unpack Click *[Yes]*.

⇨ The SIMATIC Manager now displays the unpacked project:



In this project you will find the 2 standard function blocks FB100 and FB101 (FB100 for the basic version or FB101 for the complete version).

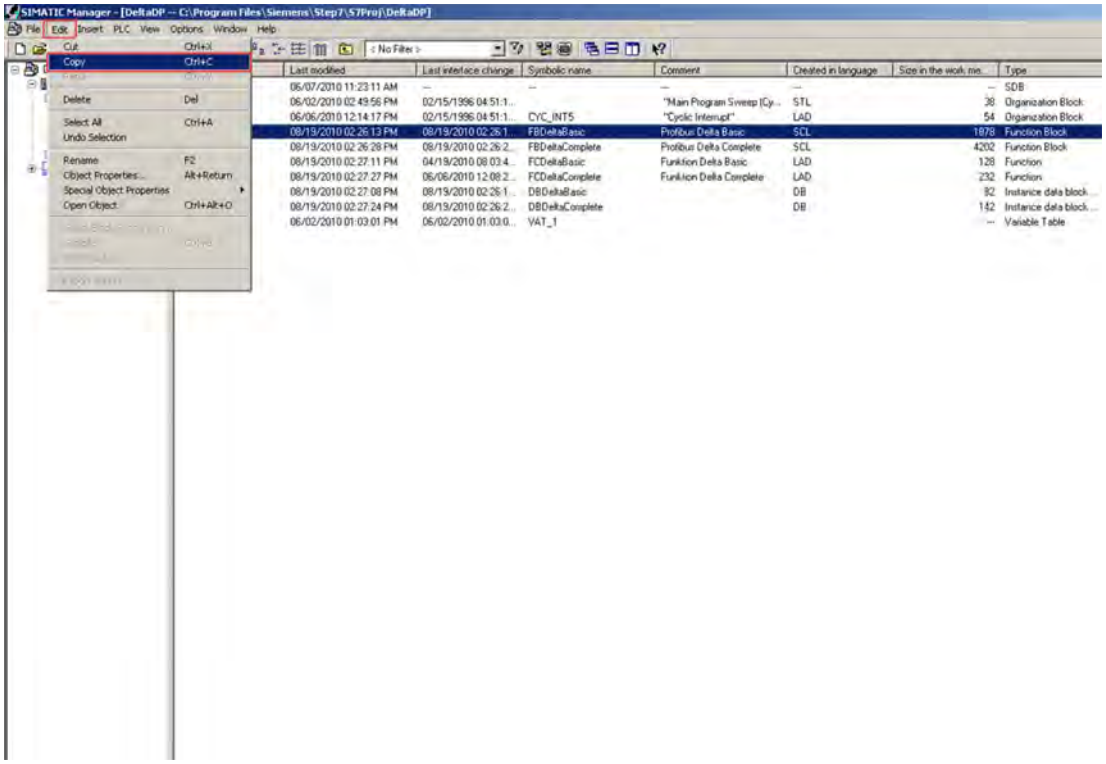
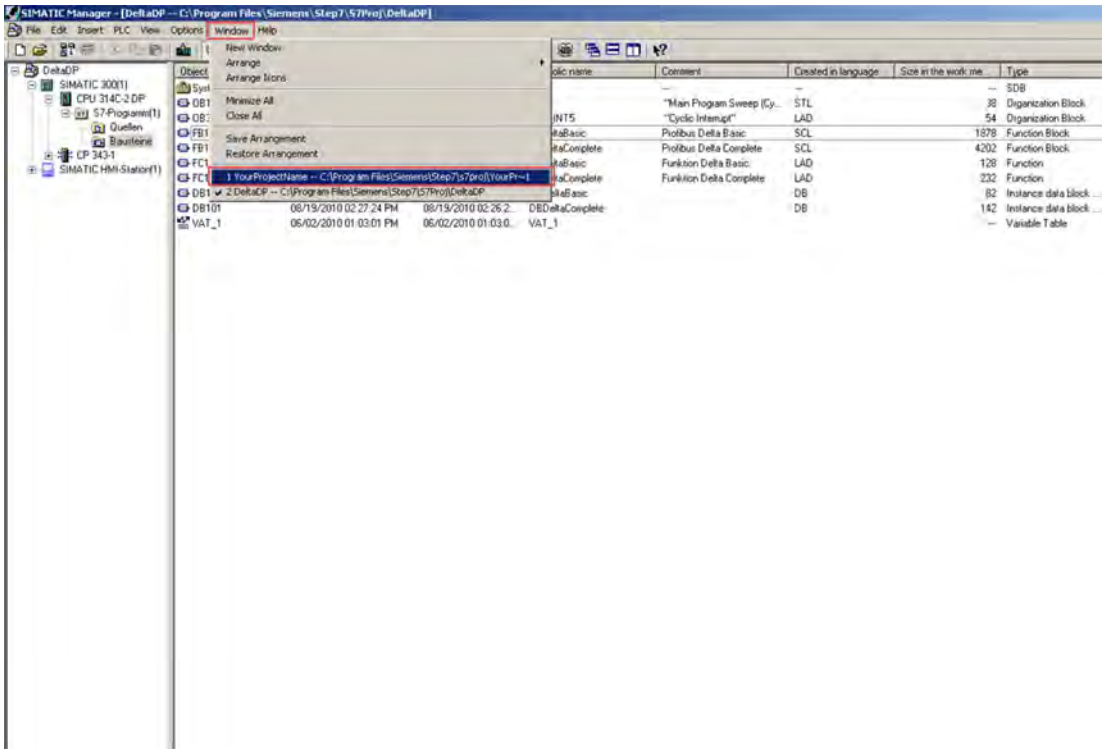
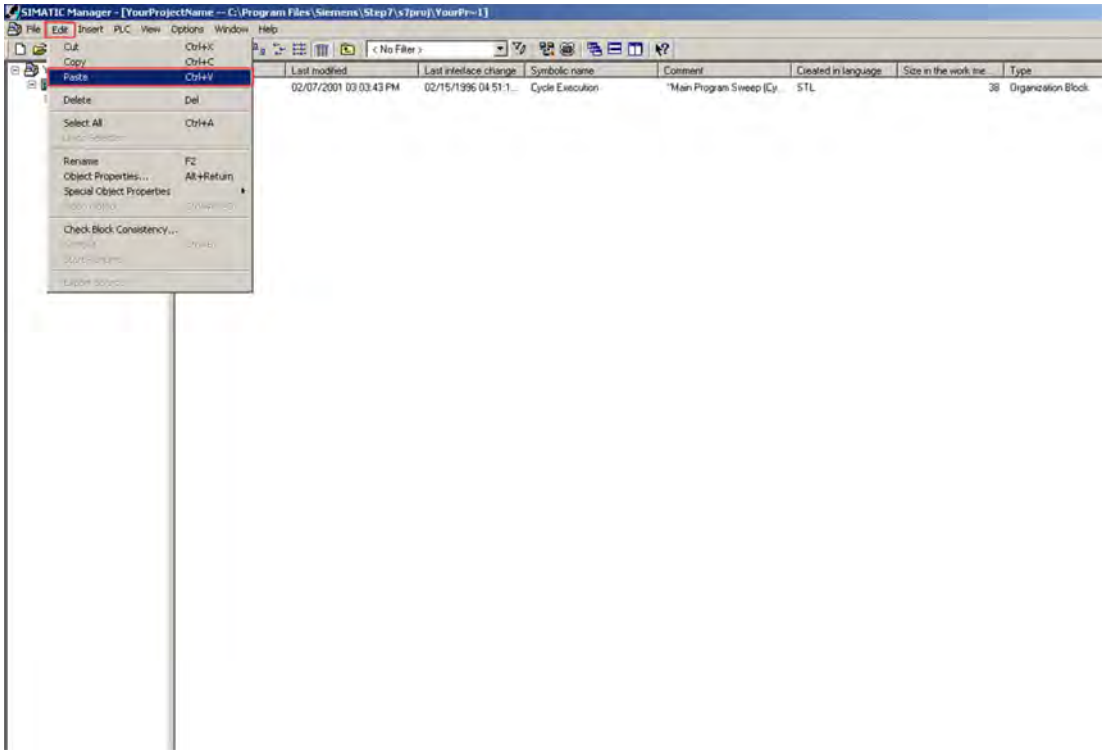


Fig. 11

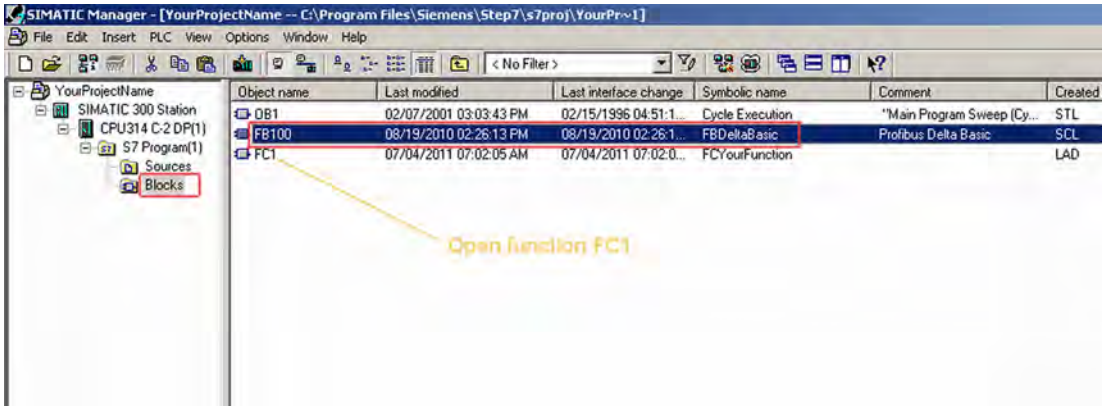
5. Select the desired function block and copy it via *'Edit ➔ Copy'*, for example.



6. Select your own project in the *'Window'* menu.

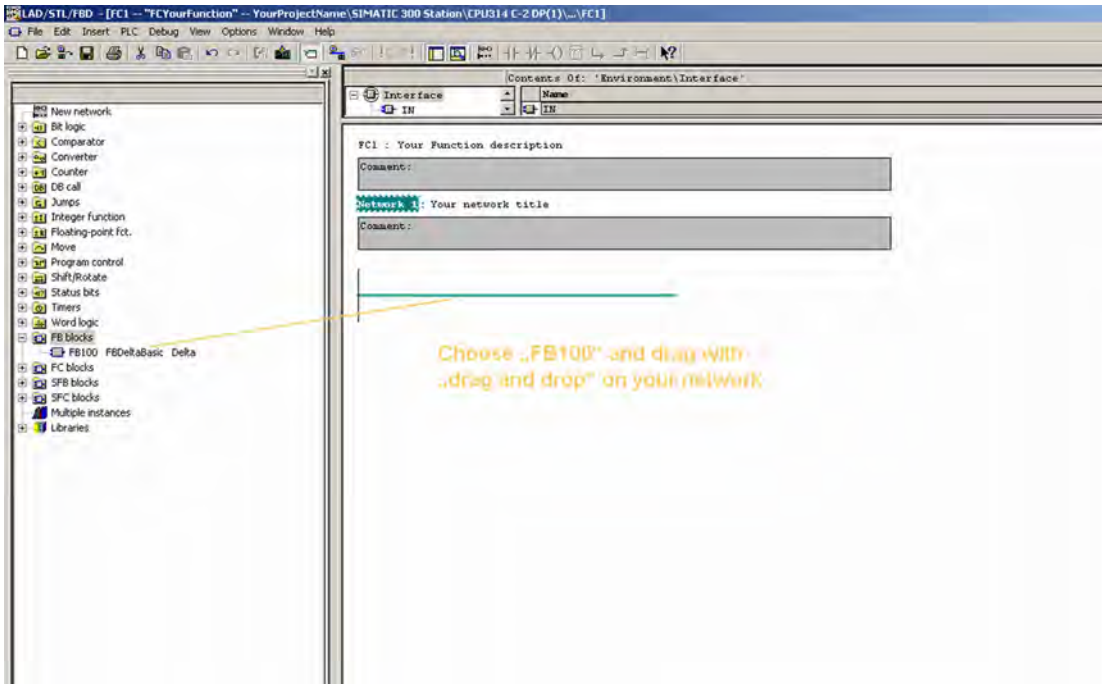


7. Copy the desired function block into your own project via the *'Edit ➔ Paste'*.



8. To link the function block into your own function, open the function by clicking it (here, FC1).

   ⇨ The following window will be displayed:



9. Now drag the function block (here FB100) out of the function block catalogue, left, with the mouse into the network shown above - see the orange arrow in the screen shot above.

   ⇨ In the window with the networks, a depiction of the function block is displayed:

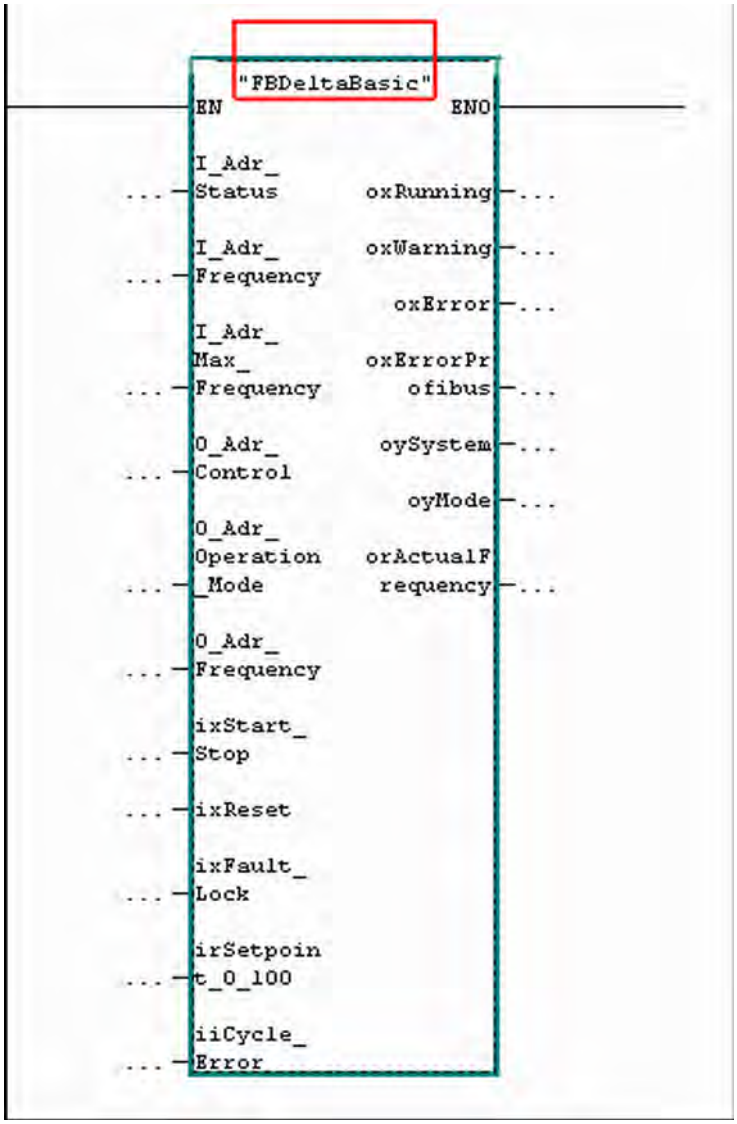
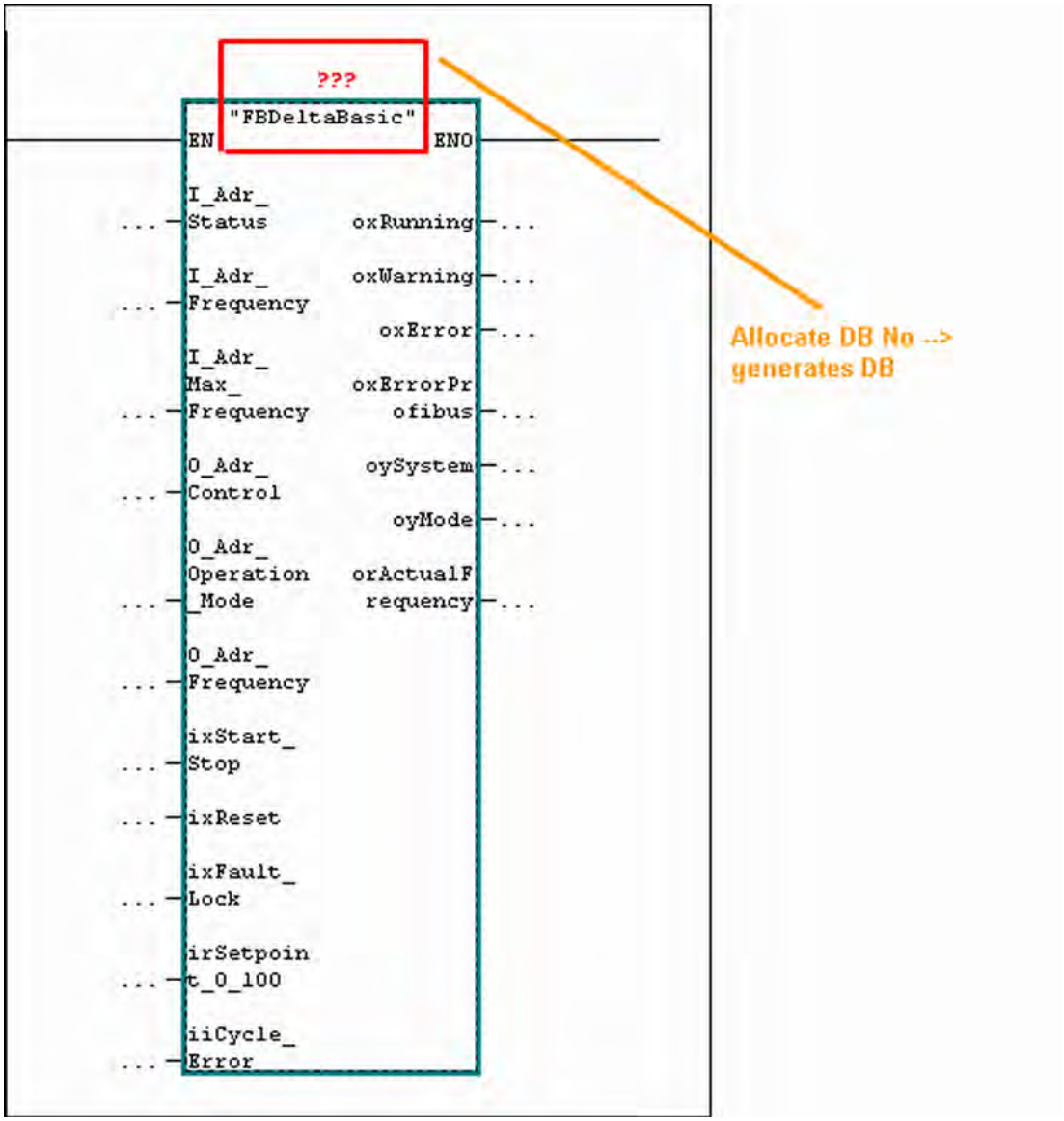


Fig. 12: Depiction of the function block FB100 for GammaXBasic-functionality

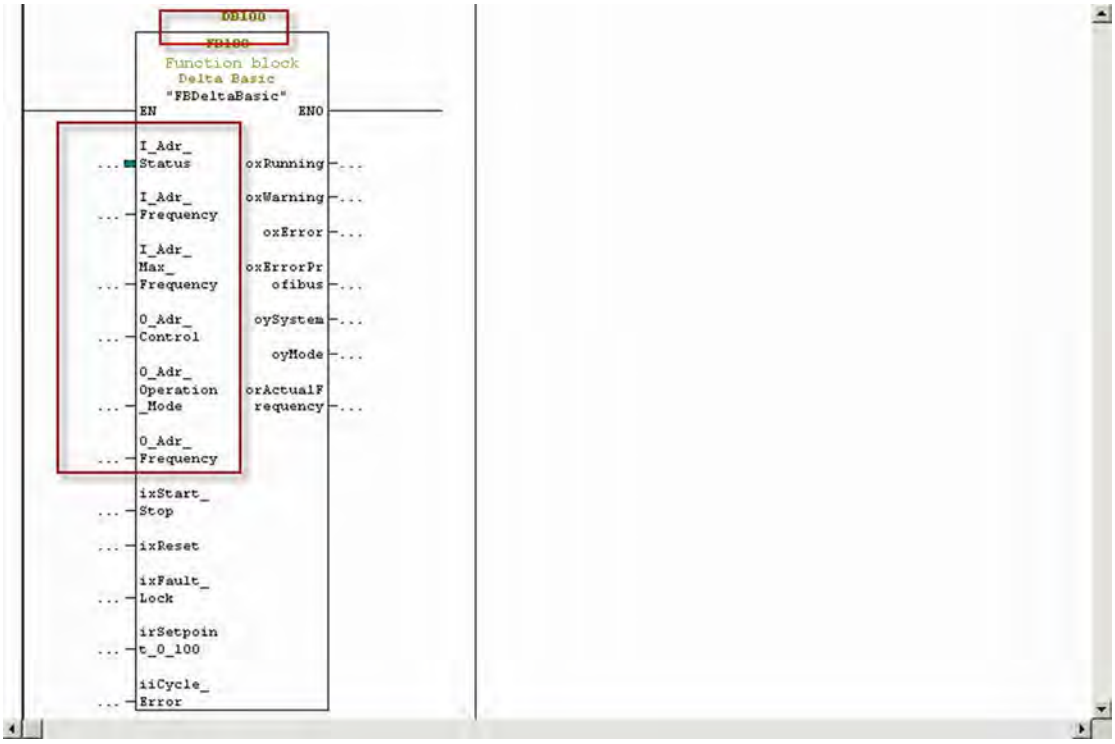
Each function block needs a data block to save its data (DB ...).

For better understandability use the same number that is used for the function block when naming the data block.



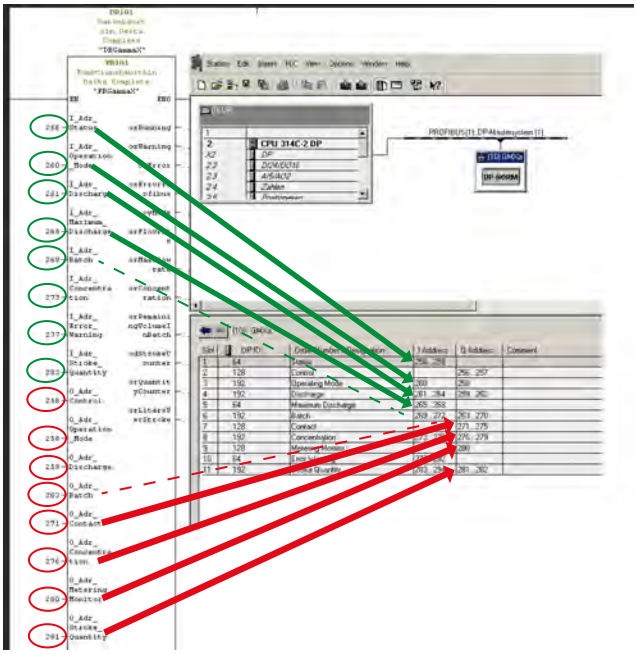
10. Double-click the red *' ??? '* and assign a name for the data block of this function block (e.g. “DB100”).

In this process the data block will be generated automatically in the background.



⇨ Now function block FB100 has the data block DB100 - see 1st red box.

11. Now the complete addresses must still be entered on the input of the function block - see 2nd red box. Then go back to the Hardware Configurator (e.g. via the task bar on the lower edge):



⇨ The green arrows in the screenshot show the relationship between the input addresses (*'I_Adr_...'* --> *'I-address'*). The red arrows show the relationship between the output addresses (*'O_Adr_...'* --> *'I-address'*).

12. Click in the function block preceding the selected address name (marked by the oval above) and enter the start address of the corresponding address range that the Hardware Configurator displays (at the tip of the arrow). Press the *[ENTER]* key.

13. Do this for all *'I_Adr_...'* and *'O_Adr_...'*.

14. To specify the remaining parameters, use your own operating concept for this pump and refer to the tables in chapter "Function block gamma/ X".

3 Installation of the GSD file in the TIA-Portal

This installation manual is only for persons who are familiar with the Siemens Simatic S7 PLC.

Prerequisites:

The installation package (such as “GammaX_S7_Funktionsblock.zip”) with the GSD file (such as "gmxa0f4e.gsd") must have been downloaded from the www.prominent.de website. (The installation package for the respective product is there.)

The installation package must be open on the PC and the GSD must be copied from the installation package into a folder.

3.1 Installing the GSD file

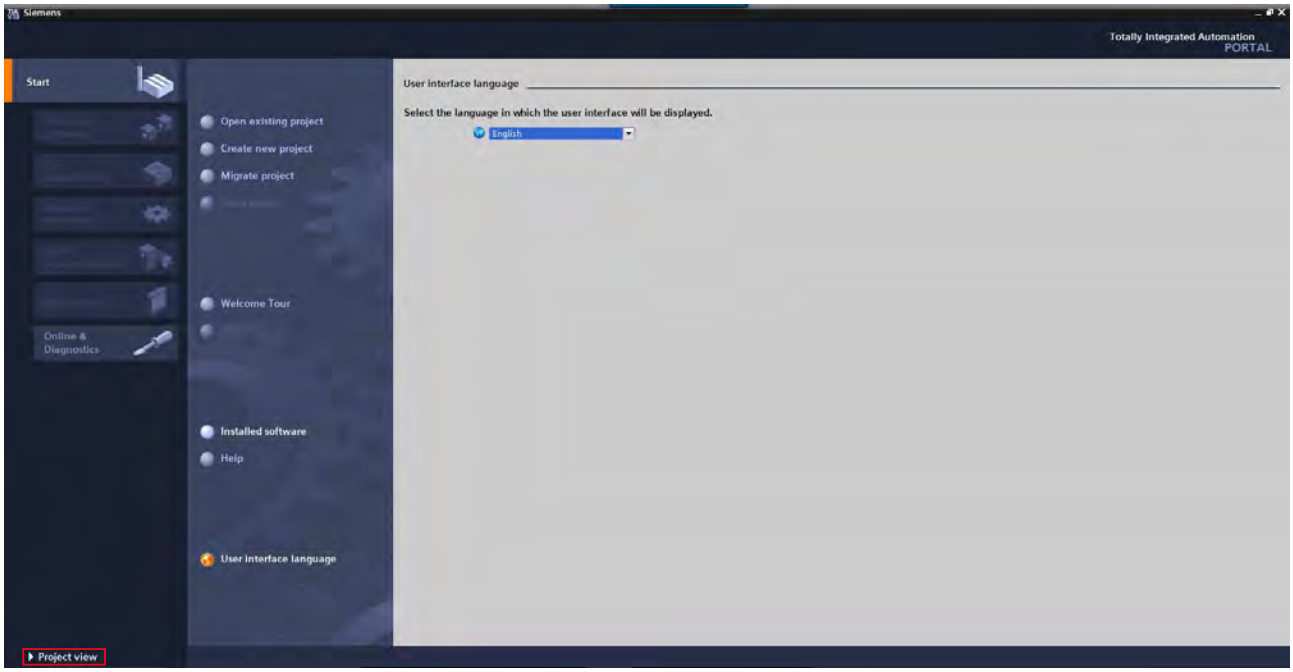


Fig. 13: TIA-Portal in the portal view

1. Change to the project view in the TIA-Portal with the *'Project view'* button.

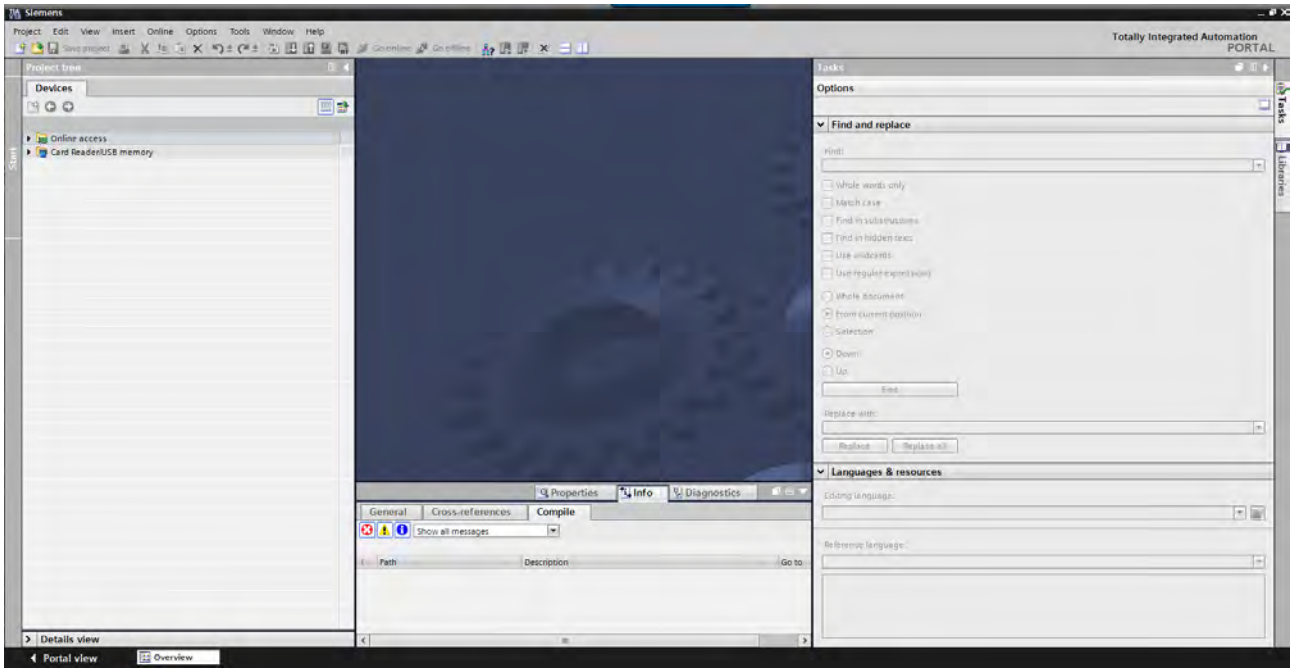
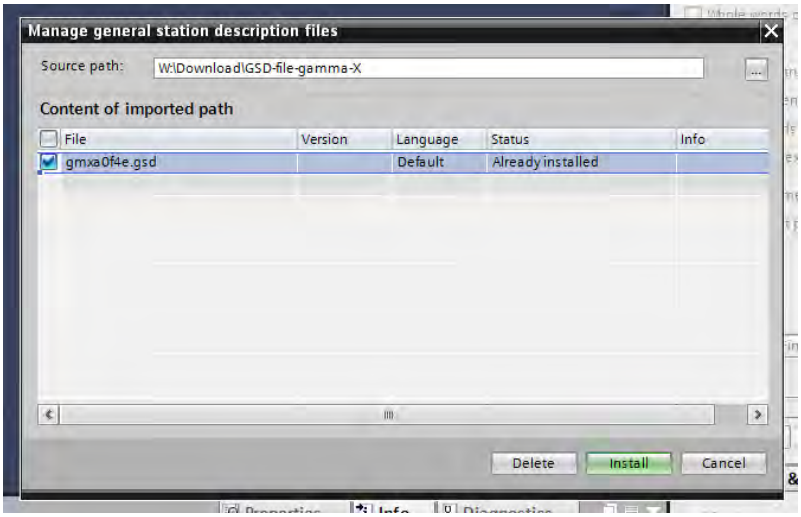


Fig. 14: TIA-Portal in the project view

2. Follow the path *'Extras ➔ Manage device description file (GSD)'* and click with the mouse.

   ⇨ The *'Manage device description file'* window will open:

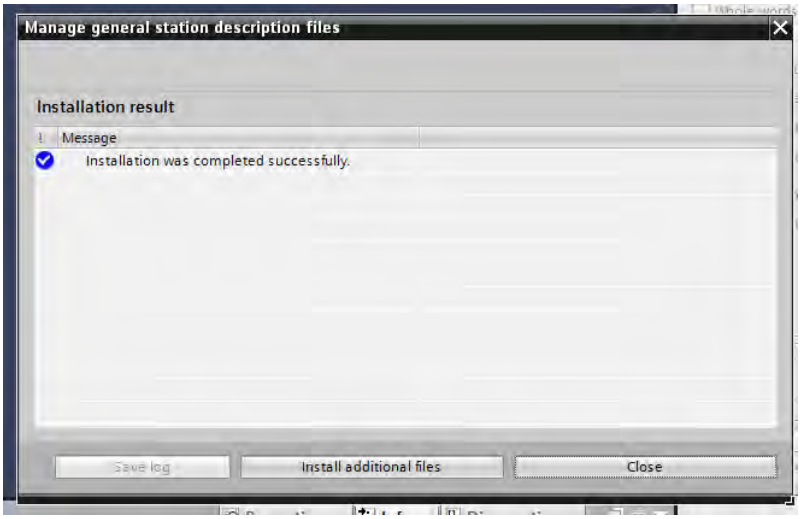


3. Use the *[...]* button to select the folder into which you have copied the GSD file.

4. If the path was correct, the GSD file will be displayed in the window. The one for the file gmxa0f4e.gsd for the gamma/ X is in this screenshot.

5. Select the file and press the *[Install]* button.

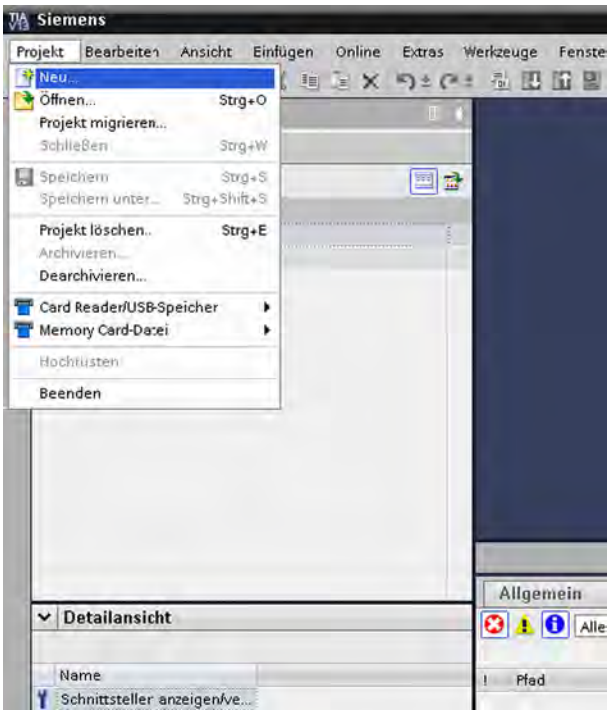
   ⇨ This message appears:



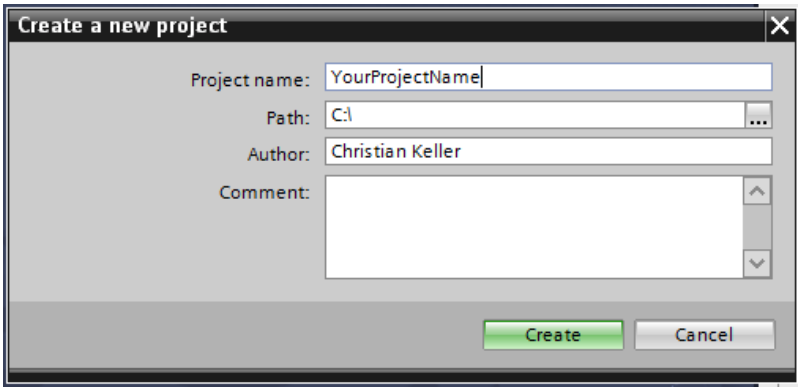
6. Click *[Close]* to conclude the installation.

The next chapter shows how to create a project in the TIA-Portal.

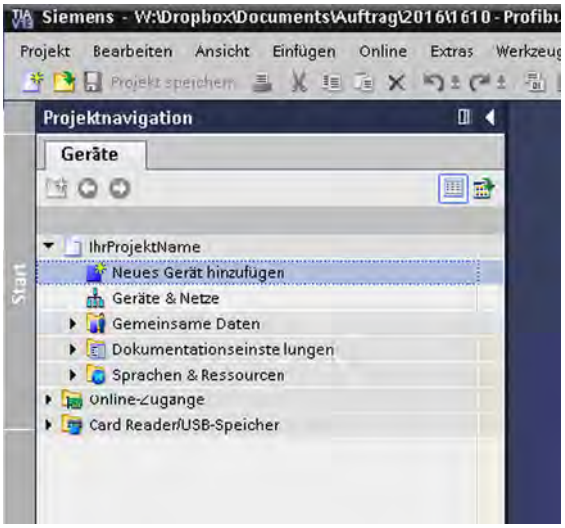
3.2 Creating a project



1. Follow the path *'Project ➔ New ...'* and click with the mouse.
   ⇨ The *'Create a new project'* window will be displayed:

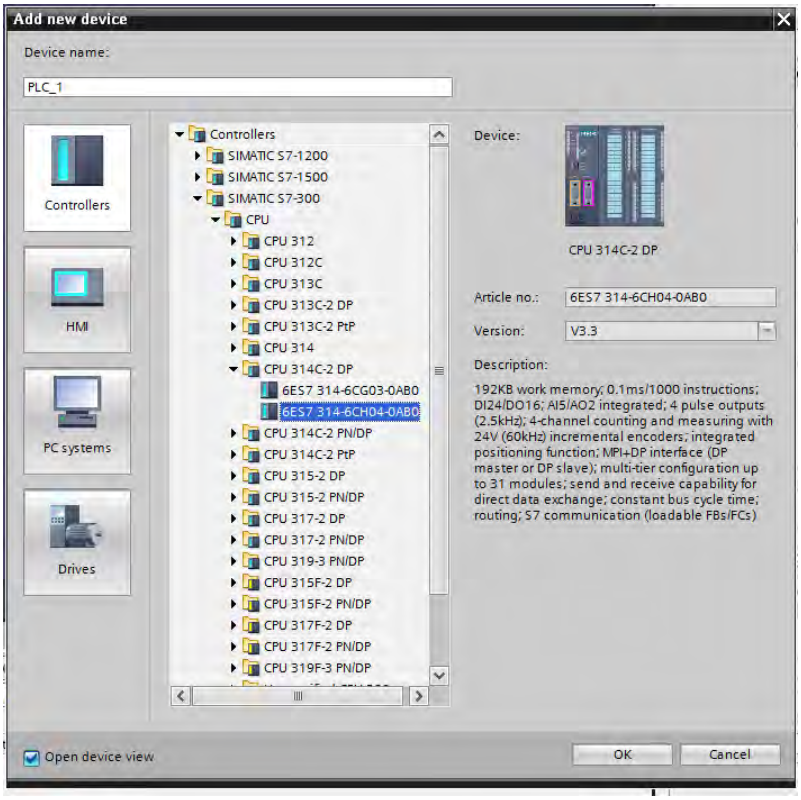


2. A project name, path, author and comments can be entered in this window.
3. Click *[Create]*.



4. Now double-click on *'Add new device'*.

⇨ The *'Add new device'* window will be displayed.



5. Select the correct CPU.

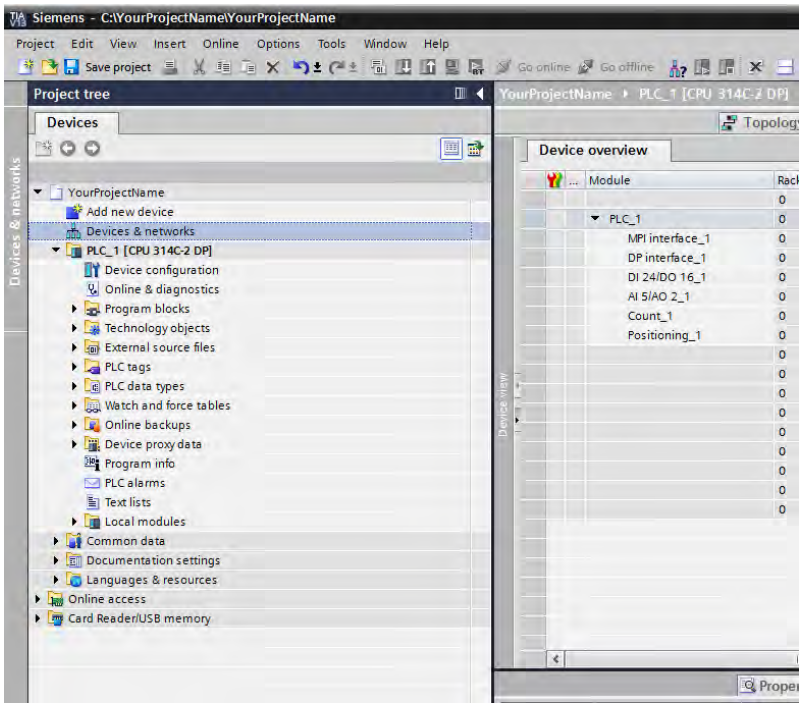
> *When selecting the correct CPU, the software version that is imprinted on the CPU and the order number help.*

Click *[OK]*.

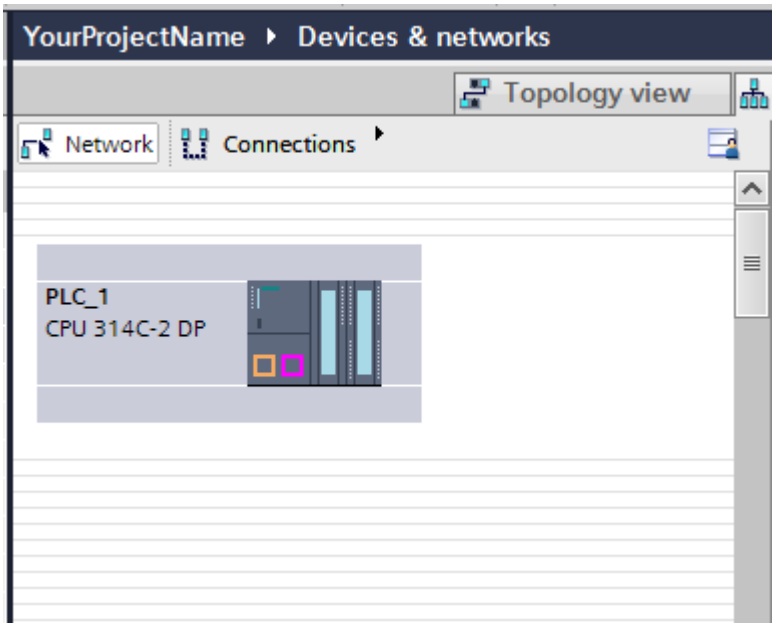
The next chapter shows how to configure the PROFIBUS in the TIA-Portal.

3.3 Configure PROFIBUS

The following steps describe the configuration of a 314C-2DP CPU. (The configuration of the communications processor is implemented in a similar manner.)

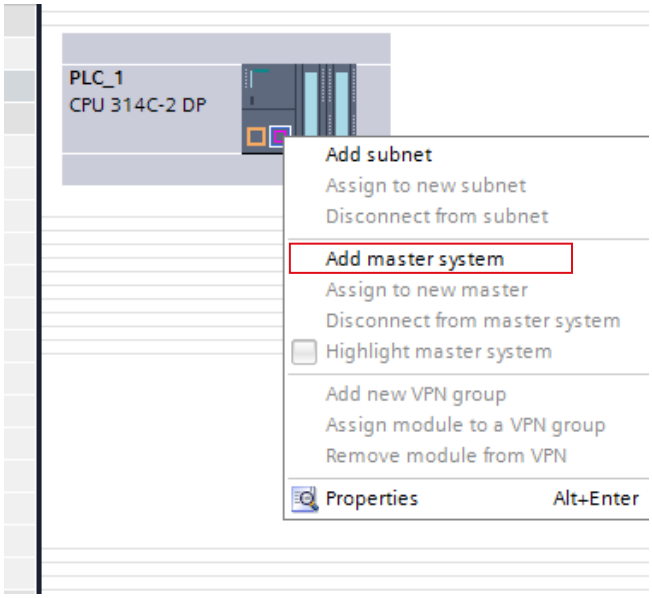


1. Change to the *'Device&networks'* view to configure:



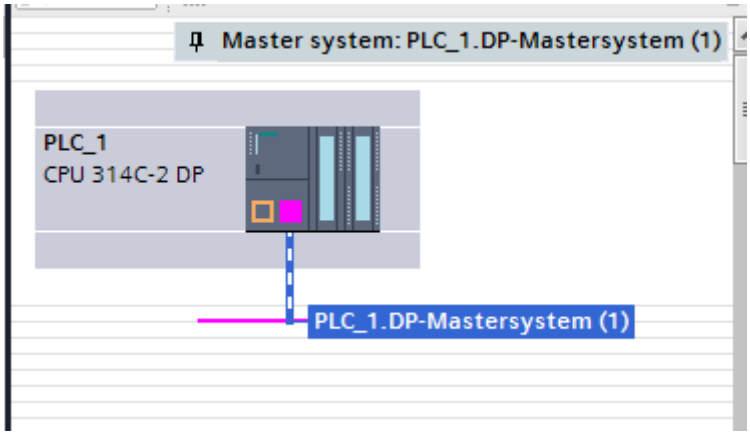
2. Now create a PROFIBUS master system: To do so, first open the purple square (PROFIBUS interface) with a right-click.

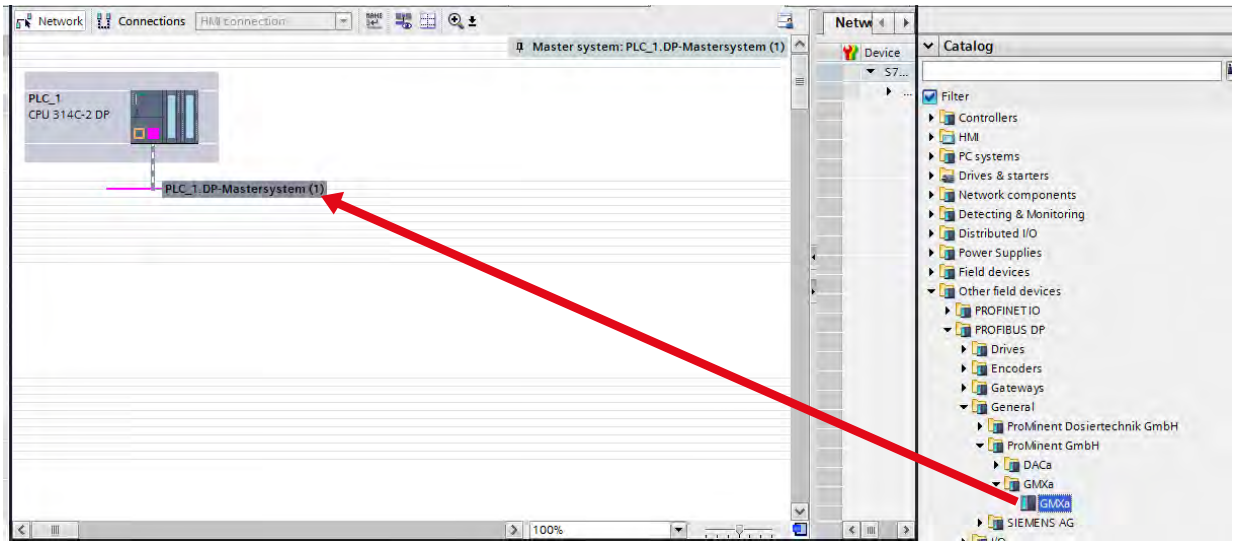
   ⇨ The context menu appears:



3. Click *'Add master system'*.

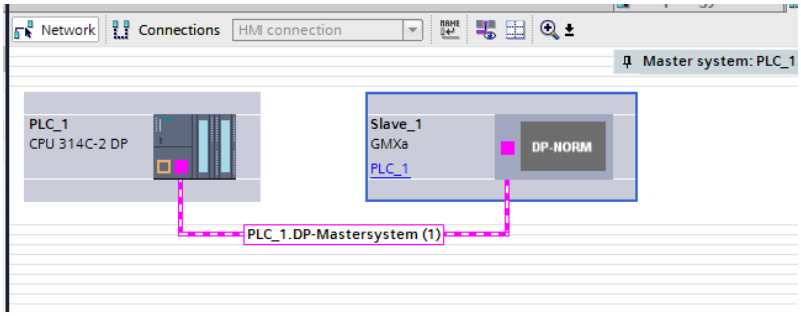
   ⇨ A master system is added (here: PLC_1.DP-Mastersystem (1)):

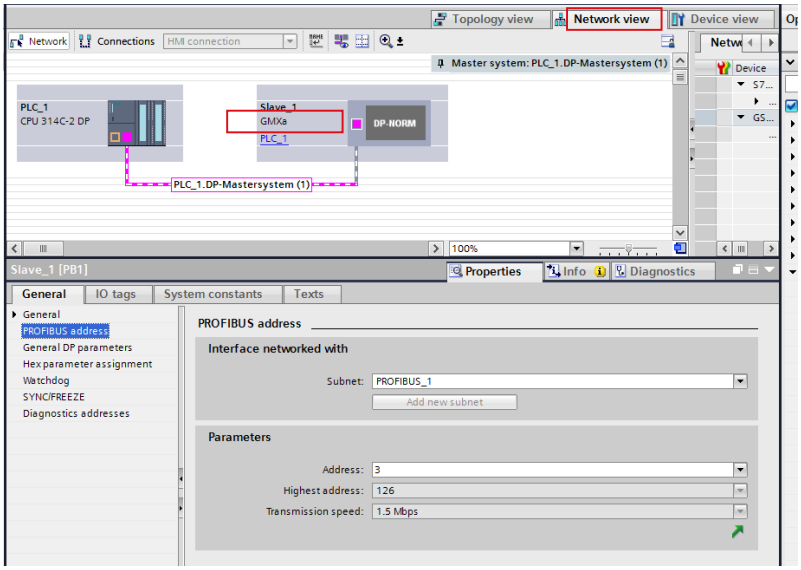




4. To add the metering pump, follow the menu path *'Other field devices ➔ PROFIBUS DP ➔ General ➔ Prominent GmbH ➔ GMXa'* in the catalogue (right window) and drag the GMXa module to the master system.

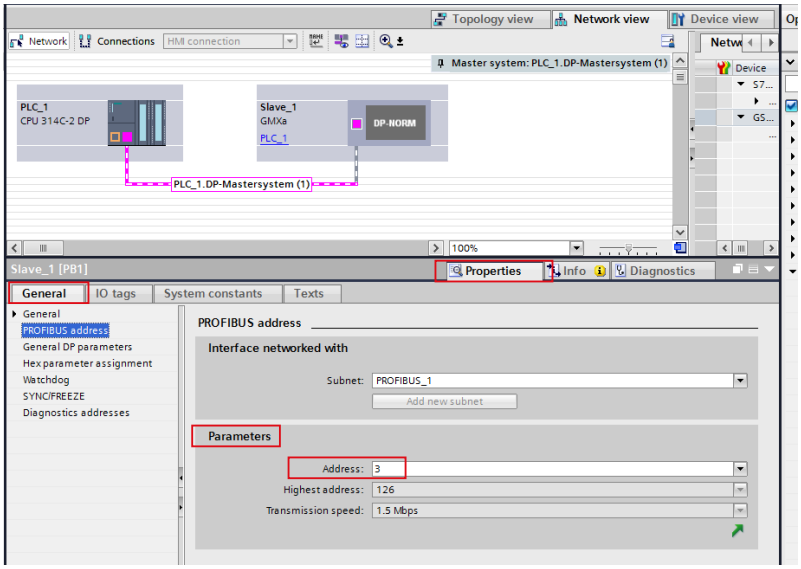
⇨ Now the metering pump is linked to the PLC.





5. Click on the *'Network view'* tab to assign the PROFIBUS address.

6. Click on the PROFIBUS interface (2nd purple square) in the graphical representation of the metering pump GMXa.



7. Right-click the *'Properties'* tab and select *'PROFIBUS address'* in the *'General'* column.

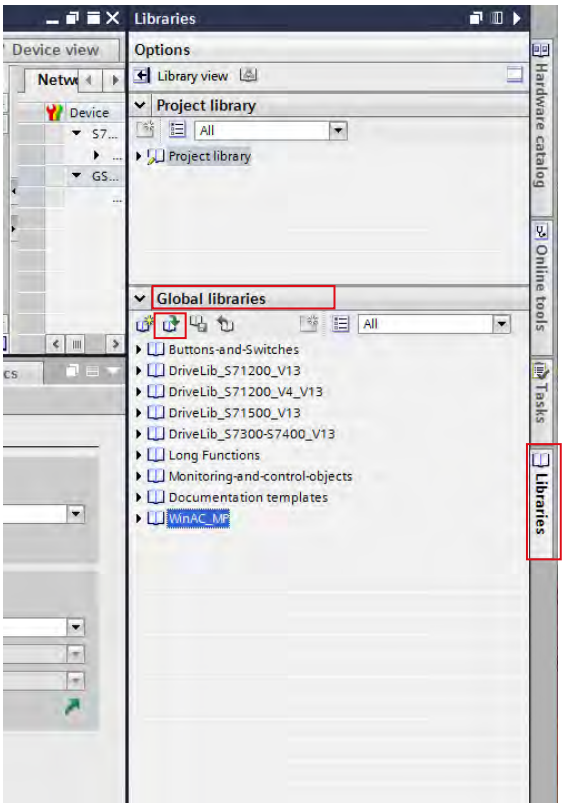
8. Enter the address of the metering pump in the *'Parameters'* field under *'Address'*.

3.4 Incorporating a function block into your own project

The supplied function blocks are embedded in the "Lib-GammaX" library - this is the only way that they can be transported.

Prerequisites:

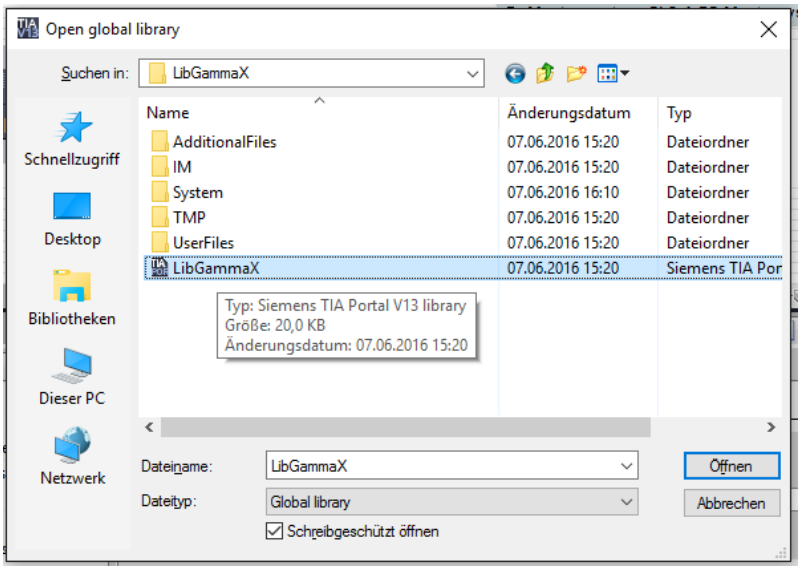
- The project must be open.



1. Click on the *'Libraries'* tab on the right edge in the TIA-Portal.
2. Click on key *[Load library]* on the right in the *'Global libraries'* window.

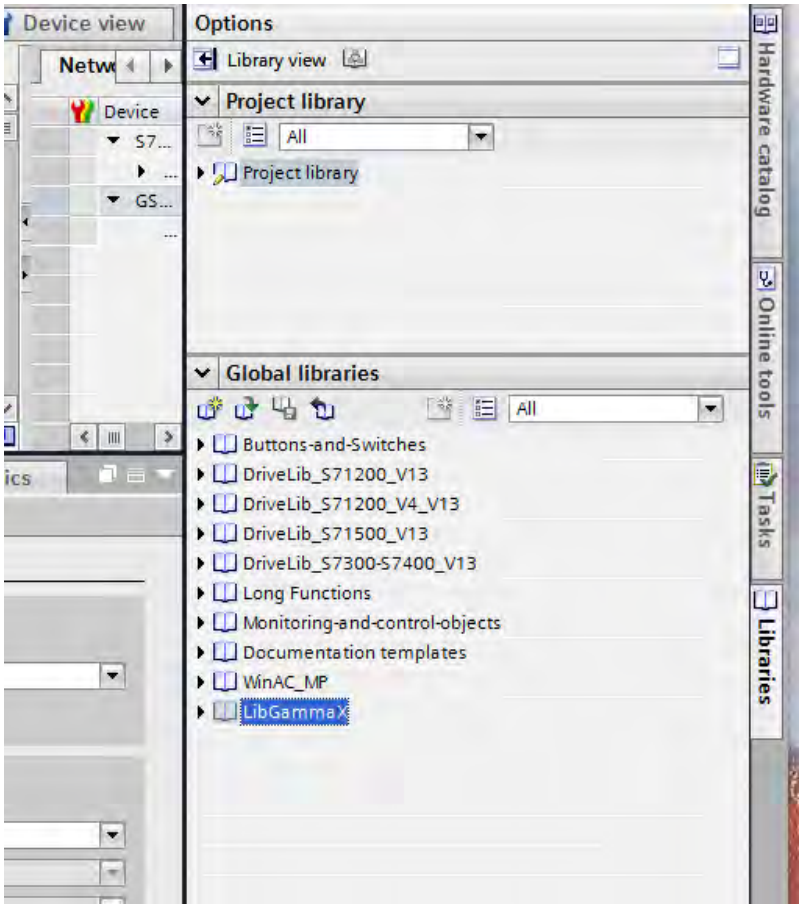
   ⇨ The libraries are loaded.
3. Click on *[Open]*.

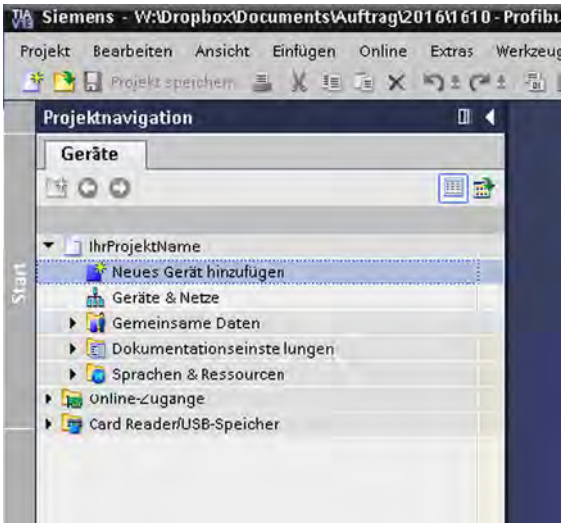
   ⇨ The *'Open global library'* window opens.



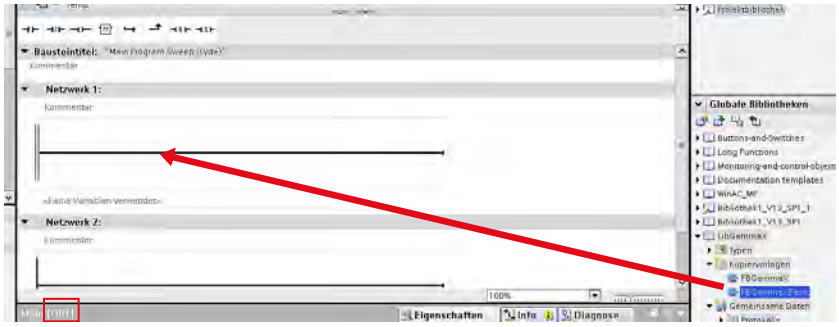
4. Select the "LibGammaX" library and click *[Open]*.

   ⇨ The "LibGammaX" library appears in the *'Global libraries'* window.



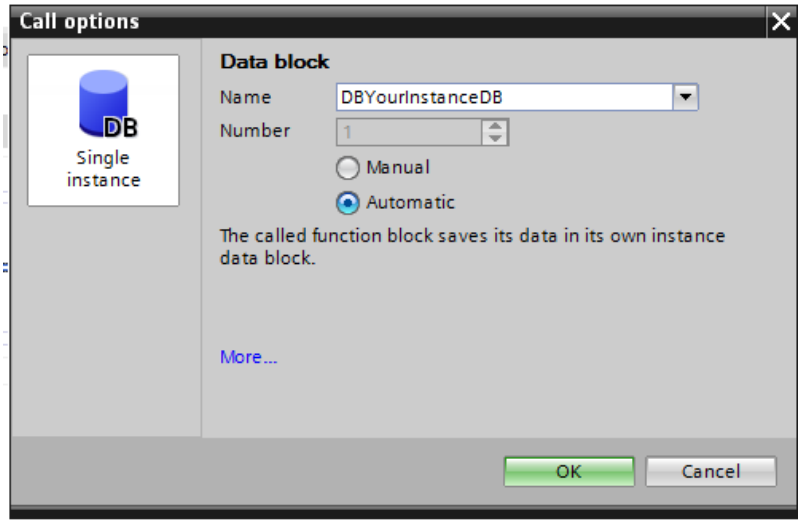


5. Now open *'Main [OB1]'*, for example, in *'Devices ➔ Program blocks'*.



6. In order to call up a function block in *'OB1'- 'Network 1'*, for example the function block GammaXBasic from the "LibGammaX" library, drag and drop to *'Network 1'* with the mouse.

   ⇨ The *'Call options'* window appears.



Each function block needs a data block to save its data (DB ...).

For better understandability use the same number that is used for the function block when naming the data block.

7. Enter a name and potentially also a number for the function block in the *'Call options'* window and save with *[OK]*.

In this process the data block will be generated automatically in the background.

   ⇨ In the window with the networks, a depiction of the function block is displayed. Now the function block is linked in the project.

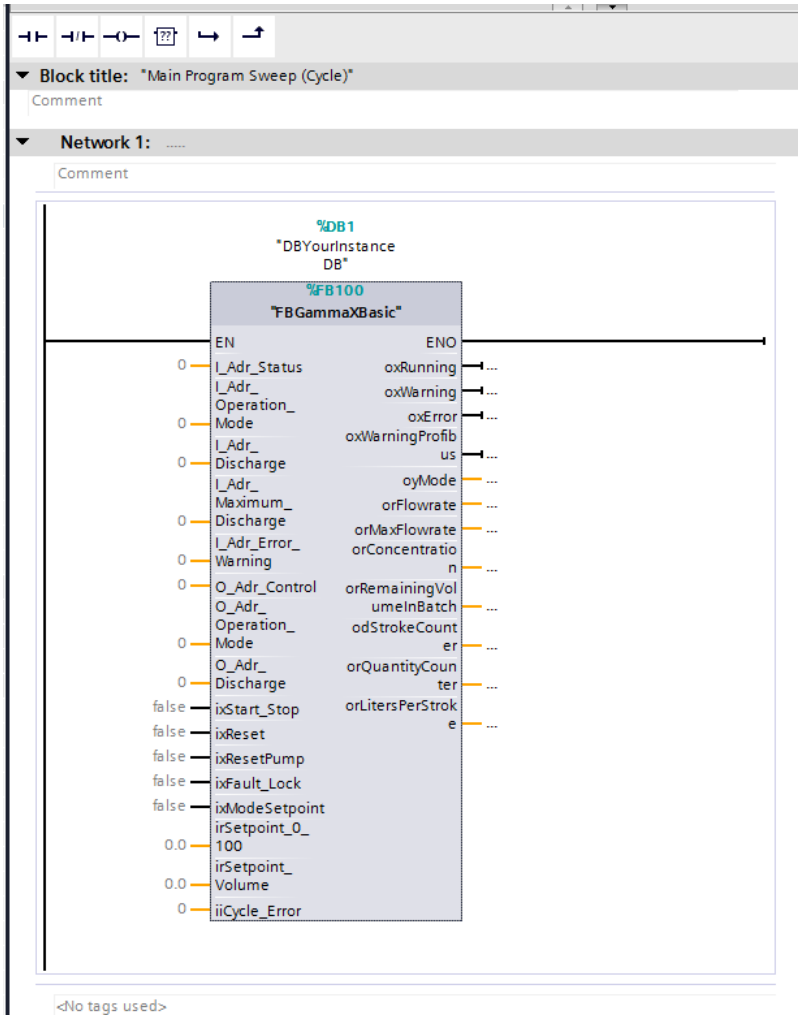


Fig. 15: Depiction of the function block GammaXBasic for GammaXBasic-functionality

8. If necessary, adjust the I-address ranges and O-address ranges. To do this double-click on the appropriate row.

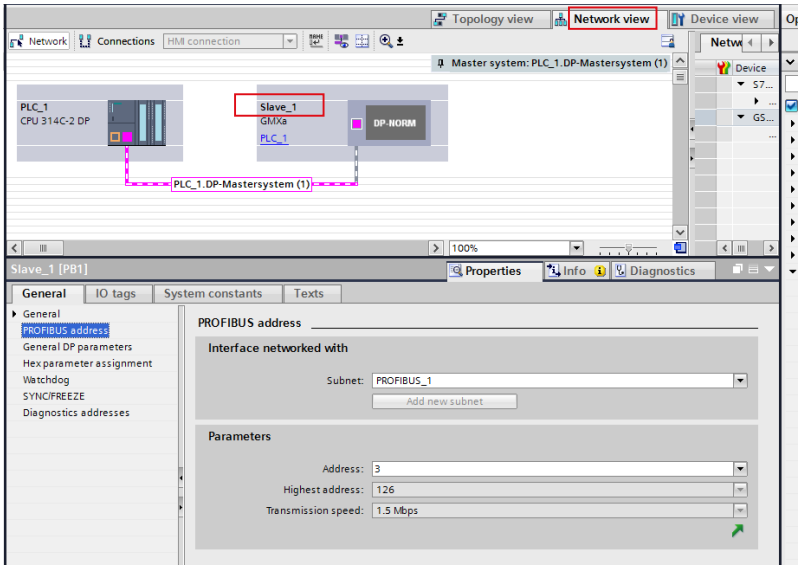
   ⇨ A window will open.

9. Here, enter the desired, changed address range and click *[OK]*.

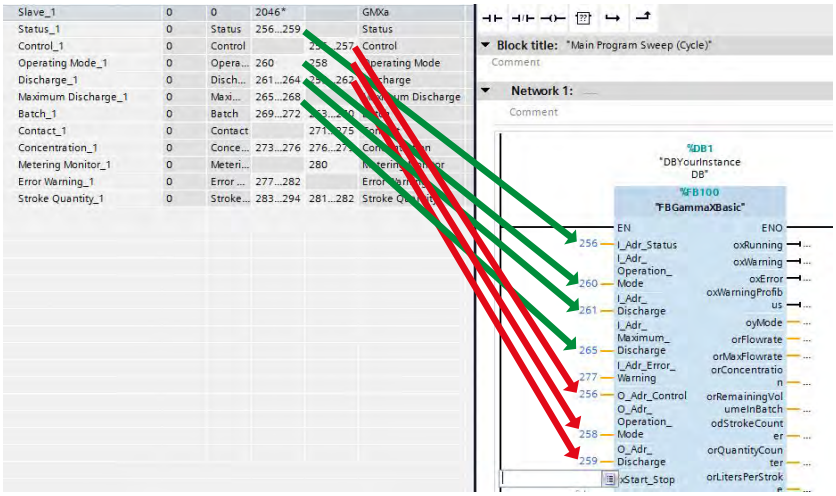
> *The Hardware Configurator will supplement the address range automatically.*
>
> *The Hardware Configurator prevents the address from being assigned twice. It handles I-addresses and O-addresses separately.*

Now the definitive addresses must still be entered on the input of the function block:

3.5 Enter metering pump function addresses



1. Click on the *'Slave'* in *'Devices&Networks ➔ Network view'*.
2. To enter the address at the function block input, change back to *'Devices&Networks'* (hardware configurator) (e.g. via the task bar at the bottom edge):



⇨

In the depiction shown here, there is a screenshot on the left side as both windows are not visible at the same time. Then work on the right side.

The green arrows in the screenshot show the relationship between the input addresses (*'I-address'* --> *'I-Adr_...'*). The red arrows show the relationship between the output addresses (*'O-address'* --> *'O_Adr_...'*).

3. Click in the function block preceding the selected address name (right window) and enter the start address of the corresponding address range that the Hardware Configurator displays (left window). Press the *[ENTER]* key.
4. Do this for all *'I_Adr_...'* and *'O_Adr_...'*.
5. To specify the remaining parameters, use your own operating concept for this pump and refer to the tables in chapter "Function block gamma/ X".

4 Function blocks gamma/ X

4.1 Introductory information

Functions of the function blocks

In the sample project there are 2 variants of function blocks:

1 - GammaXBasic for basic functionality

2 - GammaX for complete functionality

1 GammaXBasic for basic functionality contains the functions:

- Start/Stop
- Setpoint 0-100%
- Setpoint capacity in l/h
- Warning/fault message (group bit)
- Simple PROFIBUS® monitoring

2 GammaX for complete functionality contains the functions:

- Start/Stop
- Selection of setpoint specification / batch
- Batch handling
- Contact control
- Setpoint 0-100%
- Setpoint capacity in l/h
- Stroke counter
- Quantity counter
- Concentration output (option)
- Warning/fault message (group bit)
- Detail specification of the warning
- Detail specification of the fault message
- Simple PROFIBUS® monitoring

Explanation of the names in the standard function blocks

In the hardware address “I_ADR_Name" and "O_ADR_Name”:

I_	Input
O_	Output
ADR_	Address
Name	Name

In the interface names “abName”:

a (variants)

i	Input
o	Output
stat	Statistical range of the function block

b (variants)

Variant	Type	Value range	
x	Bool	false, true	
y	Byte	0 ... 255	16#00... 16#FF
i	Int	0 ... 65535	-32768 ... 32767

Variant	Type	Value range	
d	DInt	0 ... 4294967295	−2147483648 ... 2147483647
r	Real	-3.402822E +38 ... -1.175495E-38	1.175495E-38 ... 3.402822E+38

Name

Name

4.2 Function block FB100 for basic functionality

Appearance of the function block FB100 for basic functionality

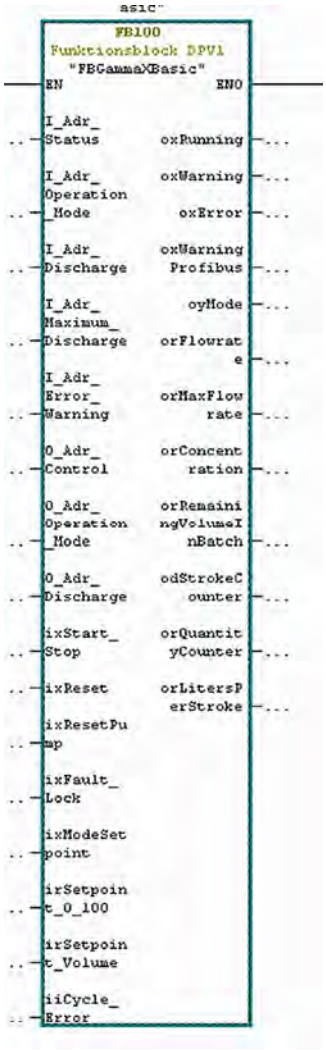


Fig. 16

Functions of the function block in the Hardware Configurator

Slot	DP ID ...	Order Number / Designation	I Address	Q Address	Comment
1	64	Status	295...298		
2	128	Control		283...284	
3	192	Operating Mode	299	285	
4	192	Discharge	300...303	286...289	
5	64	Maximum Discharge	304...307		
6	0	Empty			
7	0	Empty			
8	0	Empty			
9	0	Empty			
10	64	Error Warning	316...321		
11	0	Empty			

Discharge

Fig. 17

Address name of the function block

Address	Type	Slot	DP identification
I_Adr_Status	Int	1	64
I_Adr_Operation_Mode	Int	3	192
I_Adr_Discharge	Int	4	192
I_Adr_Maximum_Discharge	Int	5	64
I_Adr_Error_Warning	Int	10	64
O_Adr_Control	Int	2	128
O_Adr_Operation_Mode	Int	3	192
O_Adr_Discharge	Int	4	192

The address ranges of the input addresses or output addresses (from the gamma/ X to the CPU) can be read in the Hardware Configurator under "gamma" for the corresponding slots:

Interfaces of the function block

Interfaces	Type	Description
ixStart_Stop	Bool	If a 1 is present on this input and if there is no fault, the pump will be activated. If the pump does not run or is not at a standstill the following causes are possible: ■ PROFIBUS® is faulty ■ Pump is not in PROFIBUS® mode ■ PROFIBUS® address is not correct ■ Configuration is not correct ■ Pump is set to stop ■ Setpoint is on 0% (irSetpoint_0_100) ■ ixFault_Lock = 1 and oxError = 1 or oxProfibus = 1
ixReset	Bool	Resets the bit messages oxWarning, oxError and oxErrorProfibus. Resets the pump (positive flank sent).
ixResetPump	Bool	If the value of "ixResetPump" switches from 1 to 0, the internal pump memory is reset (e.g. for batch metering) and - where possible - any pending errors are reset.

Interfaces	Type	Description
ixFault_Lock	Bool	If 0, then the pump does not include a locking mechanism for stored faults. Logical link: Start pump = ixStart_Stop i.e. because the faults oxError and oxWarningProfibus require acknowledgement, the pump automatically starts up again if there is a fault on both sides. If 1, then the pump does not include a locking mechanism via fault messages oxError or oxWarningProfibus. Logical link: Start pump = ixStart_Stop & oxError = 0 & oxWarningProfibus = 0 i.e. because the faults oxError and oxWarningProfibus require acknowledgement, the pump does not automatically start up again if there is a fault on both sides.
irSetpoint_0_100	Real	Entry of the setpoint of the metering pump in %. The formula of the calculation is: Set frequency = MaxFrequency * irSetpoint / 100 Through the real number the speed on the stroke can be precisely selected, because the entry of 49.99%, for example, is possible. Likewise a direct connection of the integrated S7 controller is possible. For this the output parameter LMN must be connected on this input.
irSetpoint_Volume	Real	Entry of the setpoint of the metering pump in l/h. The formula of the calculation is: Setpoint quantity = Input quantity (Limitation 0.0 l/h – Max. metering pump capacity).
iiCycle_Error	Int	Specification of the cycles as delay of the warning and fault oxWarning, oxError and oxWarningProfibus. Short drop-outs in the PROFIBUS® system can be bridged by the delay. The delay time is calculated as follows: When using the function block in OB1: Delay = measured cycle time * iiCycle_Error When using the function block in OB35: Delay = time wake alarm * iiCycle_Errror
oxRunning	Bool	0 = pump is at standstill 1 = pump is running
oxWarning	Bool	0 = no warning 1 = warning active
oxError	Bool	0 = no fault 1 = fault active
oxWarningProfibus	Bool	0 = Profibus activated and not disrupted 1 = No Profibus activated or Profibus disrupted - Pump cannot be controlled
oyMode	Byte	01 = Manual
orFlowrate	Real	Actual value capacity in l/h
orMaxFlowrate	Real	Max. capacity in l/h

Statistical range of the instance block and flag

90.0	stat	Status.Service	BOOL	FALSE	FALSE	1=Es sind Serviceanforderungen vorhanden, 0= Es sind keine Serviceanforderungen
90.1	stat	Status.Messages	BOOL	FALSE	FALSE	1=Es sind Meldungen vorhanden, 0=Es sind keine Meldungen vorhanden
90.2	stat	Status.Error	BOOL	FALSE	FALSE	1=Störung, 0=keine Störung
90.3	stat	Status.Warnings	BOOL	FALSE	FALSE	1=Warnung, 0=keine Warnung
90.4	stat	Status.ManuelStop	BOOL	FALSE	FALSE	1=Pumpe wurde von Hand gestoppt, 0=Pumpe ist nicht von Hand gestoppt
90.5	stat	Status.Stop	BOOL	FALSE	FALSE	1=Pumpe ist gestoppt, 0=Pumpe ist nicht gestoppt
90.6	stat	Status.Intake	BOOL	FALSE	FALSE	1=Ansaugen aktiv, 0=Ansaugen inaktiv
90.7	stat	Status.Auxiliary	BOOL	FALSE	FALSE	1=Pumpe ist in Auxiliarbetrieb, 0=Pumpe ist nicht in Auxiliarbetrieb
91.0	stat	Status.Pause	BOOL	FALSE	FALSE	1=Pause aktiv, 0=Pause inaktiv
91.1	stat	Status.Module	BOOL	FALSE	FALSE	0=Automatic Mode???
91.2	stat	Status.Flow	BOOL	FALSE	FALSE	0=Dosierüberwachung inaktiv, 1=Dosierüberwachung aktiv
91.3	stat	Status.BatchMemory	BOOL	FALSE	FALSE	0=Batch Speicher ist nicht aktiviert, 1=Batch Speicher aktiviert
91.4	stat	Status.Calibrated	BOOL	FALSE	FALSE	0=Pumpe ist nicht kalibriert, 1=Pumpe ist kalibriert
91.5	stat	Status.NotUsed1	BOOL	FALSE	FALSE	nicht benutzt
91.6	stat	Status.NotUsed2	BOOL	FALSE	FALSE	nicht benutzt
91.7	stat	Status.NotUsed3	BOOL	FALSE	FALSE	nicht benutzt
92.0	stat	Status.Diaphragm	BOOL	FALSE	FALSE	0=Membranbruchsensor nicht vorhanden, 1=Membranbruchsensor vorhanden
92.1	stat	Status.Concentration	BOOL	FALSE	FALSE	0=Konzentrationsberechnung nicht aktiv, 1=Konzentrationsberechnung aktiv
92.2	stat	Status.NotUsed4	BOOL	FALSE	FALSE	nicht benutzt
92.3	stat	Status.Overpressure	BOOL	FALSE	FALSE	0=OK, 1=Antriebssteuerung meldet zu hoher Gegendruck
92.4	stat	Status.Depressurised	BOOL	FALSE	FALSE	0=OK, 1=Antriebssteuerung meldet kein Gegendruck
92.5	stat	Status.Venting	BOOL	FALSE	FALSE	0=OK, 1=Pumpe entlüftet im Moment
92.6	stat	Status.NotUsed5	BOOL	FALSE	FALSE	nicht benutzt
92.7	stat	Status.NotUsed6	BOOL	FALSE	FALSE	nicht benutzt
93.0	stat	Status.NotUsed7	BOOL	FALSE	FALSE	nicht benutzt
93.1	stat	Status.NotUsed8	BOOL	FALSE	FALSE	nicht benutzt
93.2	stat	Status.NotUsed9	BOOL	FALSE	FALSE	nicht benutzt
94.0	stat	Errors.Minimum	BOOL	FALSE	FALSE	0 = kein Fehler, 1 = Dosierflüssigkeitsstand zu gering
94.1	stat	Errors.Batch	BOOL	FALSE	FALSE	0 = kein Fehler, 1 = Zu viele Dosierhübe > 100000
94.2	stat	Errors.Aralog_4mA	BOOL	FALSE	FALSE	0 = kein Fehler, 1 = Analogstrom ist kleiner 4 mA
94.3	stat	Errors.Aralog_20mA	BOOL	FALSE	FALSE	0 = kein Fehler, 1 = Analogstrom ist größer 23 mA
94.4	stat	Errors.FlowMonitoring	BOOL	FALSE	FALSE	0 = kein Fehler, 1 = Dosierüberwachungsfehler
94.5	stat	Errors.DiaphragmFailure	BOOL	FALSE	FALSE	0 = kein Fehler, 1 = Defekte Membran im Dosierkopf
94.6	stat	Errors.AirLock	BOOL	FALSE	FALSE	0 = kein Fehler, 1 = Luft im Dosierkopf
94.7	stat	Errors.Overpressure	BOOL	FALSE	FALSE	0 = kein Fehler, 1 = Überdruck in der Hydraulik
95.0	stat	Errors.NotUsed1	BOOL	FALSE	FALSE	nicht benutzt
95.1	stat	Errors.Cavitation	BOOL	FALSE	FALSE	0 = kein Fehler, 1 = Kavitation
95.2	stat	Errors.LowPressure	BOOL	FALSE	FALSE	0 = kein Fehler, 1 = Zu geringer Druck in der Hydraulik
95.3	stat	Errors.StrokeLenghtChanged	BOOL	FALSE	FALSE	0 = kein Fehler, 1 = Im gesperrten Zustand wurde die Hublänge geändert
95.4	stat	Errors.Venting	BOOL	FALSE	FALSE	0 = kein Fehler, 1 = Automatische Entlüftung nicht möglich
95.5	stat	Errors.BusError	BOOL	FALSE	FALSE	0 = kein Fehler, 1 = Vom Modul gemeldeter Busfehler
95.6	stat	Errors.SystemError	BOOL	FALSE	FALSE	0 = kein Fehler, 1 = Systemkomponenten defekt. Siehe Display
95.7	stat	Errors.ModuleError	BOOL	FALSE	FALSE	0 = kein Fehler, 1 = Fehler im Modulhandling
96.0	stat	Warnings.Minimum	BOOL	FALSE	FALSE	0 = keine Warnung, 1 = Dosierflüssigkeitsstand ist gering
96.1	stat	Warnings.Calibration	BOOL	FALSE	FALSE	0 = keine Warnung, 1 = Hublängeneinstellung außerhalb der Kalibriertoleranz
96.2	stat	Warnings.FlowMonitoring	BOOL	FALSE	FALSE	0 = keine Warnung, 1 = Dosierüberwachungswarnung
96.3	stat	Warnings.DiaphragmFailure	BOOL	FALSE	FALSE	0 = keine Warnung, 1 = Defekte Membran im Dosierkopf
96.4	stat	Warnings.Airlock	BOOL	FALSE	FALSE	0 = keine Warnung, 1 = Luft im Dosierkopf
96.5	stat	Warnings.NotUsed1	BOOL	FALSE	FALSE	nicht benutzt
96.6	stat	Warnings.Cavitation	BOOL	FALSE	FALSE	0 = keine Warnung, 1 = Kavitation
96.7	stat	Warnings.Overpressure	BOOL	FALSE	FALSE	0 = keine Warnung, 1 = Überdruck in der Hydraulik
97.0	stat	Warnings.LowPressure	BOOL	FALSE	FALSE	0 = keine Warnung, 1 = Zu geringer Druck in der Hydraulik
98.0	stat	iiCycleFault	INT	0	0	
100.0	stat	iiCycleWarning	INT	0	0	

Fig. 18

Description of the variables of the function block (statistical range)

Variable	Type	Description
Status.Service	Bool	1 = There are service requests present - see metering pump operating instructions
Status.Messages	Bool	1 = There are messages present - see metering pump operating instructions
Status.Error	Bool	1 = Fault - see metering pump operating instructions
Status.Warnings	Bool	1 = Warning - see metering pump operating instructions
Status.ManuelStop	Bool	1 = Pump stopped manually
Status.Stop	Bool	1 = Pump stopped
Status.Intake	Bool	1 = Suction active (higher-level function)
Status.Auxiliary	Bool	1 = Pump is in auxiliary mode (higher-level function)
Status.Pause	Bool	1 = Pause active (higher-level function)
Status.Module	Bool	1 = Automatic operation
Status.Flow	Bool	1 = Metering monitor active
Status.BatchMemory	Bool	1 = Batch memory is activated
Status.Calibrated	Bool	1 = Pump is calibrated
Status.NotUsed1	Bool	Not used
Status.NotUsed2	Bool	Not used

Variable	Type	Description
Status.NotUsed3	Bool	Not used
Status.Diaphragm	Bool	1 = Diaphragm rupture indicator present
Status.Concentration	Bool	1 = Concentration calculation is activated
Status.NotUsed4	Bool	Not used
Status.Overpressure	Bool	1 = Drive controller signals “excessive counter pressure”
Status.Depressurised	Bool	1 = Drive controller signals “no counter pressure”
Status.Venting	Bool	1 = Pump vents in torque
Status.NotUsed5	Bool	Not used
Status.NotUsed...	Bool	...

Flags of the function block

Flag name	Type	Description
iiCycleWarning	Int	Flag - for how many cycles has the warning been present. If this counter is > iiCycle_Error, then oxWarning will be set
iiCycleFault	Int	Flag - for how many cycles has the fault been present. If this counter is > iiCycle_Error, then oxError will be set

Errors of the function block

Error	Type	Description
Errors.Minimum	Bool	1 = Metering medium level too low
Errors.Batch	Bool	1 = Too many metering strokes: > 100,000
Errors.Analog_<_4mA	Bool	1 = Analogue current is less than 4 mA
Errors.Analog_>_20mA	Bool	1 = Analogue current is higher than 23 mA
Errors.FlowMonitoring	Bool	1 = Error metering monitor
Errors.FailureDiaphragm	Bool	1 = Defective metering diaphragm
Errors.Airlock	Bool	1 = Air in the metering head
Errors.Overpressure	Bool	1 = Overpressure in the hydraulic system
Errors.NotUsed1	Bool	Not used
Errors.Cavitation	Bool	1 = Cavitation
Errors. LowPressure	Bool	1 = Insufficient pressure in the hydraulic system
Error.StrokeLengthChanged	Bool	1 = In blocked status someone has changed the stroke length
Error.Venting	Bool	1 = Automatic venting not possible
Errors.BusError	Bool	1 = Bus error signalled by the module
Errors.SystemError	Bool	1 = System components defective - see metering pump screen
Errors.ModulError	Bool	1 = Error in the module handling

Warnings of the function block

Warning	Type	Metering medium level description
Warnings.Minimum	Bool	1 = Level of metered liquid is low
Warnings.Calibration	Bool	1 = Stroke length setting is out of calibration tolerance

Warning	Type	Metering medium level description
Warnings.FlowMonitoring	Bool	1 = Warning metering monitor
Warnings.FailureDiaphragm	Bool	1 = Defective metering diaphragm
Warnings.Airlock	Bool	1 = Air in the metering head
Warnings.NotUsed1	Bool	Not used
Warnings.Cavitation	Bool	1 = Cavitation
Warnings.Overpressure	Bool	1 = Overpressure in the hydraulic system
Warnings.LowPressure	Bool	1 = Insufficient pressure in the hydraulic system

4.3 Function block FB101 for complete functionality

4.3.1 Explanations of the operating modes

At the input *'iyMode'*, these operating modes can be selected:

00 - Halt

01 - Manual

02 - Charge

03 - Kontakt

04 - Analog

17 - Concentration

18 - Batch (concentration)

19 - Contact (concentration)

20 - Analogue (concentration)

4.3.1.1 Manual mode

In *'manual'* mode the following signals are relevant:

- ixStart_Stop
- irSetpoint0_100
- irSetpoint_Volume
- ixFault_Lock
- ixModeSetpoint
- oxError
- oxErrorProfibus

The pumps starts, if:

ixStartStop = 1 & (ixFault_Lock = 0 or (ixFault_Lock = 1 & oxError = 0 & oxWarningProfibus = 0)

with metering speed (strokes / h) =

A - If ixModeSetpoint = 0:

Metering speed = Maximum frequency * irSetpoint0_100 / 100

B - If ixModeSetpoint = 1:

Metering speed = irSetpoint_Volume

The pump does not start up, if:

ixStartStop = 0

4.3.1.2 Batch mode

In *'Batch'* mode the following signals are relevant:

- ixStart_Stop
- ixStartBatch_Or_Contact
- ixBatchContactMemory
- iiBatchTime
- irBatchVolume
- ixFault_Lock
- oxError
- oxWarningProfibus
- odActualStrokesInBatch
- odRemainStrokesInBatch

Without memory function: *'ixBatchContactMemory'* = 0

With the input *'ixStart_Stop'* the pump can be switched off at any time.

Recommendation for operation: *'Set ixStart_Stop'* on 1 and only on 0 if needed.

The inputs *'irBatchVolume'* and *'iiBatchTime'* indicate the metering speed.

Locking mechanism = manual mode

'ixStartStop' = 1 & (*'ixFault_Lock'* = 0 or (*'ixFault_Lock'* = 1 & *'oxError'* = 0 & *'oxWarningProfibus'* = 0)

Metering speed (strokes / h) =

'irBatchVolume' / *'iiBatchTime'* (converts the metering pump to l/h.)

The pump does not start up, if:

The value = 0

The pumps starts, at:

Positive flank on input *'ixStartBatch_Or_Contact'*.

Remaining quantity is set to the value *'irBatchVolume'* (*'orRemainingVolumeInBatch'* = *'irBatchVolume'*). The metering pump runs until the remaining quantity = 0.

A renewed flank on *'ixStartBatch_Or_Contact'* resets the value of the remaining quantity to *'irBatchVolume'*. If the flank occurs during the batch, the value will be limited to only irBatchVolume (no memory function active).

With memory function: ixBatchContactMemory = 1

As "Without memory function: ixBatchContactMemory = 0, but ...

The pumps starts, at:

Positive flank on input *'ixStartBatch_Or_Contact'*.

Remaining quantity is set to the value *'irBatchVolume'* (*'orRemainingVolumeInBatch'* = *'orRemainingVolumeInBatch'* + *'irBatchVolume'*). The metering pump runs until the remaining quantity = 0.

A renewed flank on *'ixStartBatch_Or_Contact'* increases the remaining stroke remaining quantity by the value *'irBatchVolume'* (memory function active).

4.3.1.3 Contact mode

In *'Contact'* mode the following signals are relevant:

- ixStart_Stop
- ixStartBatch_Or_Contact

- ixBatchContactMemory
- irSetpoint0_100
- irSetpoint_Volume
- ixModeSetpoint
- ixFault_Lock
- oxError
- oxWarningProfibus

Without memory function: ixBatchContactMemory = 0

With the input *'ixStart_Stop'* the pump can be switched off at any time.

Recommendation for operation: *'Set ixStart_Stop'* on 1 and only on 0 if needed.

The input *'irSetpoint0_100'* or *'irSetpoint_Volume'* indicates the metering speed, depending on the input *'ixModeSetpoint'*.

Locking mechanism = manual mode

'ixStartStop' = 1 & (*'ixFault_Lock'* = 0 or (*'ixFault_Lock'* = 1 & *'oxError'* = 0 & *'oxWarningProfibus'* = 0)

If *'ixModeSetpoint'* = 0

Capacity =

Maximum capacity * *'irSetpoint0_100'* / 100

The pump does not start up, if the value is "0".

If *'ixModeSetpoint'* = 1

Capacity =

'irSetpoint_Volume'

The pump does not start up, if the value is "0".

The pumps starts, if:

Positive flank on input *'ixStartBatch_Or_Contact'*: Contact quantity = *'irContactVolume'*.

With memory function: ixBatchContactMemory = 1

As "Without memory function: ixBatchContactMemory = 0, but ...

A renewed flank on *'ixStartBatch_Or_Contact'*: e

Contact quantity = remaining quantity + *'irContactVolume'*.

4.3.1.4 Analogue mode

In *'Analogue'* mode the following signals are relevant:

- ixStart_Stop
- ixFault_Lock
- oxError
- oxWarningProfibus

The pumps starts, if:

ixStartStop = 1 & (ixFault_Lock = 0 or (ixFault_Lock = 1 & oxError = 0 & oxErrorProfibus = 0 & oxWarningWarningProfibus = 0)

with metering speed (strokes / h) in accordance with setting mA:

4mA = x strokes,

20mA = y strokes * (mA on pump /(y – x) strokes)

The pump does not start up, if:

The value = "0".

4.3.2 Tables for the addresses

Appearance of the function block GammaX for complete functionality

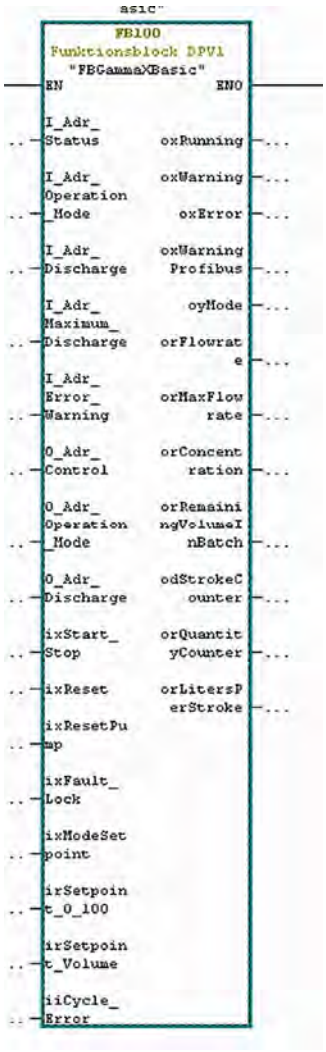


Fig. 19

Functions of the function block in the Hardware Configurator

Slot	DP ID ...	Order Number / Designation	I Address	Q Address	Comment
1	64	Status	256...259		
2	128	Control		256...257	
3	192	Operating Mode	260	258	
4	192	Discharge	261...264	259...262	
5	64	Maximum Discharge	265...268		
6	192	Batch	269...272	263...270	
7	128	Contact		271...275	
8	192	Concentration	273...276	276...279	
9	128	Metering Monitor		280	
10	64	Error Warning	277...282		
11	192	Stroke Quantity	283...294	281...282	

Fig. 20

Address name of the function block

Address	Type	Slot	DP identification
I_Adr_Status	Int	1	64
I_Adr_Operation_Mode	Int	3	192
I_Adr_Discharge	Int	4	192
I_Adr_Maximum_Discharge	Int	5	64
I_Adr_Batch	Int	6	192
I_Adr_Concentration	Int	8	192
I_Adr_Error_Warning	Int	10	64
I_Adr_Stroke_Quantity	Int	11	192
O_Adr_Control	Int	2	128
O_Adr_Operation_Mode	Int	3	192
O_Adr_Discharge	Int	4	192
O_Adr_Batch	Int	6	192
O_Adr_Contact	Int	7	128
O_Adr_Concentration	Int	8	192
O_Adr_Metering_Monitor	Int	9	128
O_Adr_Stroke_Quantity	Int	11	192

The address ranges of the input addresses or output addresses (from the gamma/ X to the CPU) can be read in the Hardware Configurator under delta for the corresponding slots.

Interfaces of the function block

Interfaces	Type	Description
ixStart_Stop	Bool	If a 1 is present on this input and if there is no fault, the pump will be activated. If the pump does not run the following causes are possible: ■ PROFIBUS® is faulty ■ Pump is not in PROFIBUS® mode ■ PROFIBUS® address is not correct ■ Pump is set to stop ■ Setpoint is on 0% (irSetpoint_0_100) ■ ixFault_Lock = 1 and oxError = 1 or oxProfibus = 1
ixStartBatch_Or_Contact	Bool	Batch mode - iyMode = 2 or iyMode = 18: Pump starts batch mode with a positive flank Contact mode - iyMode = 3 or iyMode = 19: At a positive flank the pump 1 x executes iiTransMultiplier strokes
ixBatchContactMemory	Bool	0 = Memory function is switched off 1 = Memory function is active
ixReset	Bool	Resets the bit messages oxWarning, oxError and oxWarningProfibus. Resets the pump (positive flank sent).
ixResetPump	Bool	If the value of "ixResetPump" switches from 1 to 0, the internal pump memory is reset (e.g. for batch metering) and any pending errors are reset.
ixFault_Lock	Bool	If 0, then the pump does not include a locking mechanism for stored faults. Logical link: Start pump = ixStart_Stop i.e. because the faults oxError and oxWarningProfibus require acknowledgement, the pump automatically starts up again if there is a fault on both sides. If 1, then the pump does not include a locking mechanism via fault messages oxError or oxWarningProfibus. Logical link: Start pump = ixStart_Stop & oxError = 0 & oxWarningProfibus = 0 i.e. because the faults oxError and oxWarningProfibus require acknowledgement, the pump does not automatically start up again if there is a fault on both sides.
ixResetStrokeCounter	Bool	At a positive flank the stroke counter will be reset.
ixResetQuantity	Bool	At a positive flank the quantity counter will be reset.
ixFlowControl_OnOff	Bool	0 = Metering monitor off 1 = Metering monitor on Prerequisite is an installed metering monitor.
iyMode	Byte	00 = Halt 01 = Manual 02 = Batch 03 = Contact 04 = Analogue 17 = Concentration 18 = Batch (concentration) 19 = Contact (concentration) 20 = Analogue (concentration)

Interfaces	Type	Description
irSetpoint_0_100	Real	Entry of the setpoint of the metering pump in %. The formula of the calculation is: Set quantity = MaxCapacity * irSetpoint / 100 Through the real number the speed on the stroke can be precisely selected, because the entry of 49.99%, for example, is possible. Likewise a direct connection of the integrated S7 controller is possible. For this the output parameter LMN must be connected on this input.
irSetpoint_Volume	Real	Entry of the setpoint of the metering pump in l/h. The formula of the calculation is. Setpoint quantity = Input quantity (Limitation 0.0l/h – Max. metering pump capacity).
irBatchVolume	Real	Metering volume of a batch. At a positive flank on the input ixStartBatch_Or_Contact, the volume is metered.
iiBatchTime	Int	The time in which the batch is to be metered.
irContactVolume	Real	The metering volume to be metered per contact. At a positive flank on the input ixStartBatch_Or_Contact, the volume is metered.
irConcentration	Real	Setpoint of the concentration setting (only with concentration operating mode)
iiCycle_Error	Int	Specification of the cycles as delay of the warning and fault oxWarning, oxError and oxErrorProfibus. Short drop-outs in the PROFIBUS® system can be bridged by the delay. The delay time is calculated as follows: When using the function block in OB1: Delay = measured cycle time * iiCycle_Error When using the function block in OB35: Delay = time wake alarm * iiCycle_Errror
oxRunning	Bool	1 = pump is running
oxWarning	Bool	1 = warning active
oxError	Bool	1 = fault active
oxErrorProfibus	Bool	1 = Profibus faulty
oxWarningProfibus	Bool	1 = No Profibus activated or Profibus disrupted: Pump cannot be controlled
oyMode	Byte	00 = Halt 01 = Manual 02 = Batch 03 = Contact 04 = Analogue 17 = Concentration 18 = Batch (concentration) 19 = Contact (concentration) 20 = Analogue (concentration)

Interfaces	Type	Description
orFlowrate	Real	Actual value capacity in l/h
orMaxFlowrate	Real	Max. capacity in l/h
orConcentration	Real	Current concentration of the metering pump (option must be enabled)
orRemainingVolumeInBatch	Real	Remaining volume that is currently still to be metered in batch operation
odStrokeCounter	DInt	Current value of the stroke counter in the metering pump
orLitersPerStroke	Real	Current quantity in the quantity counter of the metering pump

Statistical range of the instance block and flag

90.0	stat	Status.Service	BOOL	FALSE	FALSE	1=Es sind Serviceanforderungen vorhanden, 0= Es sind keine Serviceanforderungen
90.1	stat	Status.Messages	BOOL	FALSE	FALSE	1=Es sind Meldungen vorhanden, 0=Es sind keine Meldungen vorhanden
90.2	stat	Status.Error	BOOL	FALSE	FALSE	1=Störung, 0=keine Störung
90.3	stat	Status.Warnings	BOOL	FALSE	FALSE	1=Warnung, 0=keine Warnung
90.4	stat	Status.ManuelStop	BOOL	FALSE	FALSE	1=Pumpe wurde von Hand gestoppt, 0=Pumpe ist nicht von Hand gestoppt
90.5	stat	Status.Stop	BOOL	FALSE	FALSE	1=Pumpe ist gestoppt, 0=Pumpe ist nicht gestoppt
90.6	stat	Status.Intake	BOOL	FALSE	FALSE	1=Ansaugen aktiv, 0=Ansaugen inaktiv
90.7	stat	Status.Auxiliary	BOOL	FALSE	FALSE	1=Pumpe ist in Auxiliarbetrieb, 0=Pumpe ist nicht in Auxiliarbetrieb
91.0	stat	Status.Pause	BOOL	FALSE	FALSE	1=Pause aktiv, 0=Pause inaktiv
91.1	stat	Status.Module	BOOL	FALSE	FALSE	0=Automatic Mode???
91.2	stat	Status.Flow	BOOL	FALSE	FALSE	0=Dosierüberwachung inaktiv, 1=Dosierüberwachung aktiv
91.3	stat	Status.BatchMemory	BOOL	FALSE	FALSE	0=Batch Speicher ist nicht aktiviert, 1=Batch Speicher aktiviert
91.4	stat	Status.Calibrated	BOOL	FALSE	FALSE	0=Pumpe ist nicht kalibriert, 1=Pumpe ist kalibriert
91.5	stat	Status.NotUsed1	BOOL	FALSE	FALSE	nicht benutzt
91.6	stat	Status.NotUsed2	BOOL	FALSE	FALSE	nicht benutzt
91.7	stat	Status.NotUsed3	BOOL	FALSE	FALSE	nicht benutzt
92.0	stat	Status.Diaphragm	BOOL	FALSE	FALSE	0=Membranbruchsensor nicht vorhanden, 1=Membranbruchsensor vorhanden
92.1	stat	Status.Concentration	BOOL	FALSE	FALSE	0=Konzentrationsberechnung nicht aktiv, 1=Konzentrationsberechnung aktiv
92.2	stat	Status.NotUsed4	BOOL	FALSE	FALSE	nicht benutzt
92.3	stat	Status.Overpressure	BOOL	FALSE	FALSE	0=OK, 1=Antriebssteuerung meldet zu hoher Gegendruck
92.4	stat	Status.Depressunsed	BOOL	FALSE	FALSE	0=OK, 1=Antriebssteuerung meldet kein Gegendruck
92.5	stat	Status.Venting	BOOL	FALSE	FALSE	0=OK, 1=Pumpe entlüftet im Moment
92.6	stat	Status.NotUsed5	BOOL	FALSE	FALSE	nicht benutzt
92.7	stat	Status.NotUsed6	BOOL	FALSE	FALSE	nicht benutzt
93.0	stat	Status.NotUsed7	BOOL	FALSE	FALSE	nicht benutzt
93.1	stat	Status.NotUsed8	BOOL	FALSE	FALSE	nicht benutzt
93.2	stat	Status.NotUsed9	BOOL	FALSE	FALSE	nicht benutzt
94.0	stat	Errors.Minimum	BOOL	FALSE	FALSE	0 = kein Fehler, 1 = Dosierflüssigkeitsstand zu gering
94.1	stat	Errors.Batch	BOOL	FALSE	FALSE	0 = kein Fehler, 1 = Zu viele Dosierhübe > 100000
94.2	stat	Errors.Aralog_4mA	BOOL	FALSE	FALSE	0 = kein Fehler, 1 = Analogstrom ist kleiner 4 mA
94.3	stat	Errors.Aralog_20mA	BOOL	FALSE	FALSE	0 = kein Fehler, 1 = Analogstrom ist größer 23 mA
94.4	stat	Errors.FlowMonitoring	BOOL	FALSE	FALSE	0 = kein Fehler, 1 = Dosierüberwachungsfehler
94.5	stat	Errors.DiaphragmFailure	BOOL	FALSE	FALSE	0 = kein Fehler, 1 = Defekte Membran im Dosierkopf
94.6	stat	Errors.AirLock	BOOL	FALSE	FALSE	0 = kein Fehler, 1 = Luft im Dosierkopf
94.7	stat	Errors.Overpressure	BOOL	FALSE	FALSE	0 = kein Fehler, 1 = Überdruck in der Hydraulik
95.0	stat	Errors.NotUsed1	BOOL	FALSE	FALSE	nicht benutzt
95.1	stat	Errors.Cavitation	BOOL	FALSE	FALSE	0 = kein Fehler, 1 = Kavitation
95.2	stat	Errors.LowPressure	BOOL	FALSE	FALSE	0 = kein Fehler, 1 = Zu geringer Druck in der Hydraulik
95.3	stat	Errors.StrokeLenghtChanged	BOOL	FALSE	FALSE	0 = kein Fehler, 1 = Im gesperrten Zustand wurde die Hublänge geändert
95.4	stat	Errors.Venting	BOOL	FALSE	FALSE	0 = kein Fehler, 1 = Automatische Entlüftung nicht möglich
95.5	stat	Errors.BusError	BOOL	FALSE	FALSE	0 = kein Fehler, 1 = Vom Modul gemeldeter Busfehler
95.6	stat	Errors.SystemError	BOOL	FALSE	FALSE	0 = kein Fehler, 1 = Systemkomponenten defekt. Siehe Display
95.7	stat	Errors.ModuleError	BOOL	FALSE	FALSE	0 = kein Fehler, 1 = Fehler im Modulhandling
96.0	stat	Warnings.Minimum	BOOL	FALSE	FALSE	0 = keine Warnung, 1 = Dosierflüssigkeitsstand ist gering
96.1	stat	Warnings.Calibration	BOOL	FALSE	FALSE	0 = keine Warnung, 1 = Hublängeneinstellung außerhalb der Kalibriertoleranz
96.2	stat	Warnings.FlowMonitoring	BOOL	FALSE	FALSE	0 = keine Warnung, 1 = Dosierüberwachungswarnung
96.3	stat	Warnings.DiaphragmFailure	BOOL	FALSE	FALSE	0 = keine Warnung, 1 = Defekte Membran im Dosierkopf
96.4	stat	Warnings.Airlock	BOOL	FALSE	FALSE	0 = keine Warnung, 1 = Luft im Dosierkopf
96.5	stat	Warnings.NotUsed1	BOOL	FALSE	FALSE	nicht benutzt
96.6	stat	Warnings.Cavitation	BOOL	FALSE	FALSE	0 = keine Warnung, 1 = Kavitation
96.7	stat	Warnings.Overpressure	BOOL	FALSE	FALSE	0 = keine Warnung, 1 = Überdruck in der Hydraulik
97.0	stat	Warnings.LowPressure	BOOL	FALSE	FALSE	0 = keine Warnung, 1 = Zu geringer Druck in der Hydraulik
98.0	stat	iiCycleFault	INT	0	0	
100.0	stat	iiCycleWarning	INT	0	0	

Fig. 21

Statistical range of the instance block of the function block GammaX

Variable	Type	Description
Status.Service	Bool	1 = There are service requests present - see metering pump operating instructions
Status.Messages	Bool	1 = There are messages present - see metering pump operating instructions
Status.Error	Bool	1 = Errors are present
Status.Warnings	Bool	1 = Warnings are present
Status.ManuelStop	Bool	1 = Pump has been stopped manually

Variable	Type	Description
Status.Stop	Bool	1 = Pump stopped
Status.Intake	Bool	1 = Pump is in intake operation (higher-level function - see metering pump operating manual)
Status.Auxiliary	Bool	1 = Pump is in auxiliary mode (higher-level function)
Status.Pause	Bool	1 = Pump is switched to pause (higher-level function)
Status.Module	Bool	1 = Automatic operation
Status.Flow	Bool	1 = Metering monitor active
Status.BatchMemory	Bool	1 = Batch memory is activated
Status.Calibrated	Bool	1 = Pump is calibrated
Status.NotUsed1	Bool	Not used
Status.NotUsed2	Bool	Not used
Status.NotUsed3	Bool	Not used
Status.Diaphragm	Bool	1 = Diaphragm break option is installed
Status.Concentration	Bool	1 = Concentration calculation is activated
Status.NotUsed4	Bool	Not used
Status.Overpressure	Bool	1 = Drive controller signals “excessive counter pressure”
Status.Depressurised	Bool	1 = Drive controller signals “no counter pressure”
Status.Venting	Bool	1 = Pump vents in torque
Status.NotUsed5	Bool	Not used
Status.NotUsed ...	Bool	...

Flags of the function block

Flag name	Type	Description
iiCycleWarning	Int	Flag - for how many cycles has the warning been present. If this counter is > iiCycle_Error, then oxWarning will be set
iiCycleFault	Int	Flag - for how many cycles has the fault been present. If this counter is > iiCycle_Error, then oxError will be set

Name of the error messages of the function block

Name of the error messages	Type	Description
Errors.Minimum	Bool	1 = Level of metering medium too low
Errors.Batch	Bool	1 = Too many metering strokes (>100,000)
Errors.Analog_<_4mA	Bool	1 = Analogue current is less than 4 mA
Errors.Analog_>_20mA	Bool	1 = Analogue current is higher than 23 mA
Errors.FlowMonitoring	Bool	1 = Error metering monitor
Errors.FailureDiaphragm	Bool	1 = Diaphragm break
Errors.Airlock	Bool	1 = Air in the metering head
Errors.Overpressure	Bool	1 = Overpressure in the hydraulic system
Errors.NotUsed1	Bool	Not used

Name of the error messages	Type	Description
Errors.Cavitation	Bool	1 = Cavitation
Errors.LowPressure	Bool	1 = Insufficient pressure in the hydraulic system
Errors.StrokeLenghtChanged	Bool	1 = In blocked status the stroke length has been changed
Errors.Venting	Bool	1 = Automatic venting not possible
Errors.BusError	Bool	1 = Bus error signalled by the module
Errors.SystemError	Bool	1 = System component defective See LCD screen
Errors.ModulError	Bool	1 = Error in the module handling
Warnings.Minimum	Bool	1 = Metering medium level is too low
Warnings.Calibration	Bool	1 = Stroke length out of calibration tolerance
Warnings.FlowMonitoring	Bool	1 = Metering monitor warning
Warnings.FailureDiaphragm	Bool	1 = Diaphragm break
Warnings.Airlock	Bool	1 = Air in the metering head
Warnings.Overpressure	Bool	1 = Overpressure in the hydraulic system
Warnings.LowPressure	Bool	1 = Insufficient pressure in the hydraulic system

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