Integration of S7 – 300 Package Units in SIMATIC PCS 7 with the Industry Library

SIMATIC PCS 7 V9.0 SP1, Industry Library V9.0, TIA Portal V14 SP1

https://support.industry.siemens.com/cs/ww/en/view/50708061

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1 Automation task

Introduction

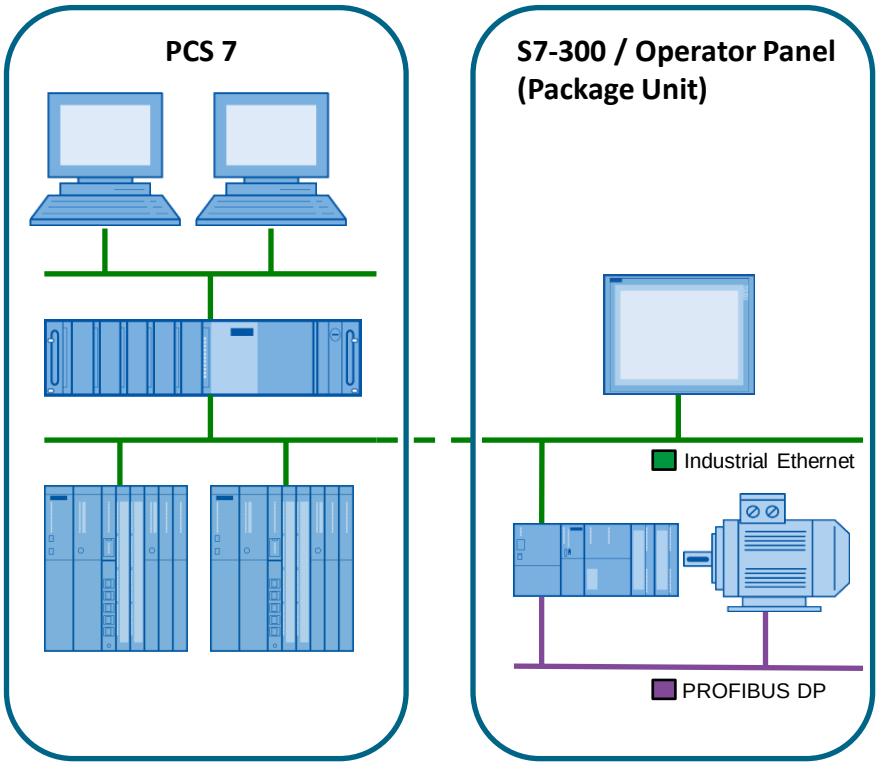
In many production plants, additional machines and aggregates must be operated in addition to the actual process engineering components. Such package units (PU) are often finished subsystem models for special production tasks, or are equipped with plant components that do not belong to the PCS 7 standard, such as S7-300 controllers or operator panels. Package units can be centrifuges, dryers or weighing stations, for example.

Problems often occur when connecting package units to the control system. Different operating, display and processing forms and inconsistent alarm systems make it difficult to integrate package units into the higher-level process control system. With the Industry Library this is

Description of the automation task

The system engineer is to be shown how S7-300 automation systems and operator panels (HMI devices) can be integrated into a PCS 7 project. Configuration should match the PCS 7 standard as closely as possible.

Figure 1-1



2 Automation solutions

Use of the PCS 7 Industry Library (IL)

A standardized way to integrate S7-300 controllers and operator panels is provided by the "IL for S7" library. It contains technological components for processing actuators and sensors that can also be run on S7-300 automation systems.

The blocks are reportable (Alarm_DQ) and can be operated and monitored on the OS. Using the associated interface blocks and the WinCC Comfort image blocks from the WinCC Comfort V14 library („IL for WinCC Comfort), a visualization can be configured on the operator panel.

Advantages of the solution using PCS 7 Industry Library

- Harmonic overall solutions for control system tasks, and as a result, optimum operation of the overall process by avoiding operation faults
- The number of functions created by the user is reduced, resulting in cost savings over the entire life cycle.
- Synergy effects related to training and knowledge transfer

Exclusions

The following topics are not covered in this document:

- Connection of S7-200, S7-1200, S7-1500
- Integration of third-party systems
  The following article already includes one way of achieving this automation task:
  http://support.automation.siemens.com/WW/view/en/49740087
- PROFIBUS interface
  In this documentation, reference is only made to the use of Ethernet connections, but it is also possible to use PROFIBUS DP. The only difference lies in configuring the connection. In the case of a redundant PROFIBUS system, the following article may be of assistance.
  http://support.automation.siemens.com/WW/view/en/19951154
- Programming S7 function blocks
- Creating faceplates on the OS and on the Comfort Panel
  (You can find related information in the SIMATIC PCS 7 and TIA Portal V14 documentation.)

Required knowledge

Basic knowledge of configuration using SIMATIC PCS 7 and knowledge of configuration using the TIA Portal are required.

Scenarios for connection of an S7-300 package unit (PU)

This document presents two different scenarios. These are in particular:

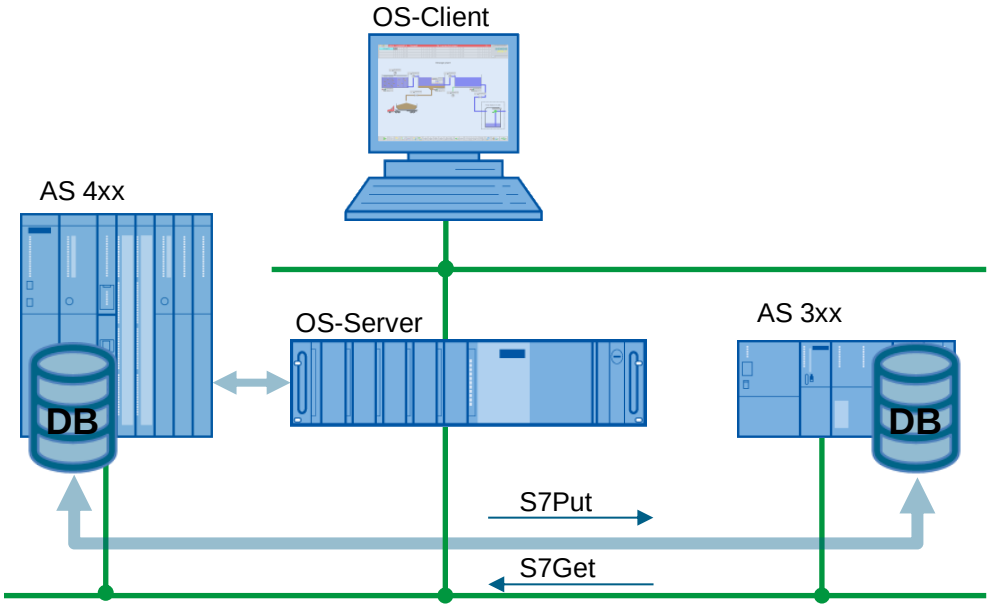
- Communication between S7-400 and S7-300 controllers using the "S7Get" and "S7Put" blocks
  (see Chapter 4 „S7-400-side communication")
- Configuring an S7-300 package unit incl. panel
  (see Chapter 5 „Configuration of the S7-300 with Industry Library"

2.1 S7-400-side communication

By means of the block "S7Get" the values of a DB are read out from a S7-300 CPU and transferred into the DB of an S7-400 CPU of the PCS 7 system. The processing of the data takes place in the S7-400 and is written back to the DB of the S7-300 using the block "S7Put". By processing the data in the S7-400, they can be easily integrated into the PCS 7 OS.

With this solution no intervention in the project engineering of the S7-300 control program is necessary, since both the block "S7Get" and the block "S7Put" run in the S7-400. It may be necessary at most to introduce defined interfaces in the form of data blocks.

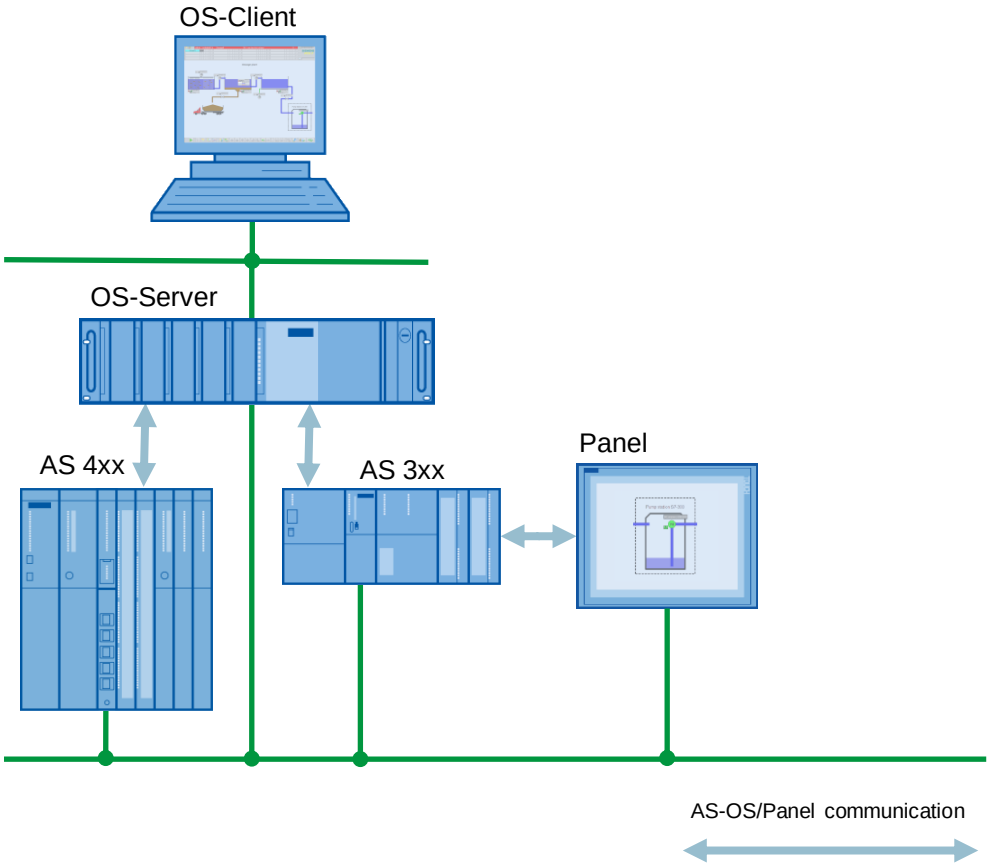
Figure 2-1



2.2 Configuration of the S7-300 with Industry Library

In this scenario, the PU program is processed exclusively in the S7-300 controller. By using the technological modules and the interface modules of the "IL for S7", a visualization is created on the PCS 7 OS and on the operator panel. The control program of the PU is thus recreated with IL means.

Figure 2-2



3 Basics

The following section describes various basic principles for implementing the project planning, and which enable optimum interaction between PCS 7 and the PU. These basics and concepts are used in Chapter 4 "S7-400-side communication" and Chapter 5 "Configuration of the S7-300 with Industry Library" to create the automation solution.

3.1 PCS 7 Industry Library

The "IL for S7" block library used in this application contains communication blocks, monitoring blocks, technological blocks, operating blocks and simulation blocks. The blocks are operated and observed via associated image blocks.

The alarm concept of the "IL for S7" is based on the system function block "ALARM_DQ". In addition, interface modules for visualization of the technological functions are available on the operator panel.

The following libraries of the PCS 7 Industry Library are used to integrate S7-300 controllers and operator panels in the PCS 7 environment:

Table 3-1

Library	Description
PCS 7 Industry Library V9.0 Upd 1: IL for S7	Technological components for the use of S7-300 controllers and image components for visualization on the OS. WinCC flexible image block library for display and operation on the operator panel.
PCS 7 Industry Library V9.0 Upd 1: IL for WinCC Comfort	The Industry Library for WinCC Comfort (TIA Portal) includes all the necessary components (tags, connections, picture elements) for displaying on the Comfort Panel.

Reasons for using Industry Library

- Risk minimization thanks to standardization
- Uniform look and feel with PCS 7 APL
- Easy integration of S7-300 controllers, Multi Panels and Comfort Panels
- Direct PCS 7 server access to S7-300 controllers (no sub-networking)
- Reduction in the time and costs for development
- The best setup for upgrading to newer PCS 7 versions

System requirements for using Industry Library

PCS 7 Industry Library V9.0 Upd1 can be used with the following configuration software:

Table 3-2

Library	Configuration software
IL for PCS 7	SIMATIC PCS 7 V9.0 SP1 SIMATIC PCS 7 APL V9.0
IL for S7	SIMATIC STEP 7 V5.6 SIMATIC S7 CFC V9.0 AS-OS Engineering V9.0 SIMATIC WinCC V7.4 SP1 Upd1 Installed Industry Library V9.0 or SIMATIC PCS 7 V9.0 SP1 with installed Industry Library V9.0
IL for WinCC Comfort	SIMATIC Step7 Professional V14 SP1 Upd4

Minimum hardware requirements:

Table 3-3

Library	Hardware
IL for PCS 7	The system requirements of SIMATIC PCS 7 V9.0 SP1 apply
IL for S7	S7 CPU-315 PN/DP with firmware from V3.1
IL for WinCC Comfort	Comfort / Multi Panels (display size ≥ 12 inch)

Note

Update 1 for the Industry Library V9.0 is required for use with PCS 7 V9.0 SP1 and the TIA Portal V14 SP1.

The update is available for download under the following entry:
https://support.industry.siemens.com/cs/ww/en/view/109480136

Calculation recommendation of a CPU-315 PN/DP with Industry Library

A CPU-315 PN/DP has the following relevant resources:

- Work memory: 384kB
- Simultaneous messages: 300

(See operating instructions "CPU 31xC and CPU 31x: Technical specifications" http://support.automation.siemens.com/WW/view/en/12996906)

If, for example, the following program parts are controlled as mixed configuration in a CPU-315 PN/DP, experience has shown that their load is approx. 60%.

- 20 measuring points
- 20 drives
- 2 aggregates
- 2 controllers

Multi Panels and Comfort Panels

The Comfort Panels of the TP series are the successor panels for the Multi Panels of the MP series. The Multi Panels can still be planned as shown in this application example, but it is recommended to switch to Comfort Panels as these offer a considerably higher screen resolution, functionality and performance.

Note From the TIA Portal V15 onwards, Multi Panels can no longer be configured.

You can find the corresponding successor products in the following entry: https://support.industry.siemens.com/cs/ww/en/view/109486162

3.2 Time synchronization

In PCS 7 systems, it is necessary for the clock times of all components, including PC stations, automation systems and other peripherals, to be synchronized. This is important in ensuring the chronological sequence of processes or the correct chronological order for archiving messages.

Various scenarios for time synchronization, such as a domain server or a central system clock, are conceivable as time-of-day masters.

Note You can find detailed information about time synchronization in the manual "SIMATIC Process Control System PCS 7 time synchronization"

Integration of operator panels

The operator panels should also be synchronized to avoid time inconsistencies. However, these cannot be synchronized using the SIMATIC or NTP process.

For operator panels, area pointers are set up that synchronize the system time of the AS with the system time of the panel. The control program has to make the current system time available to the area pointer using "SFC 51 - READ_CLK".

Configuring the time synchronization will be explained in the remainder of the documentation.

Note You can find further details about time synchronization of operator panels in the entry:
Clock synchronization between an HMI operator interface and a SIMATIC PLC

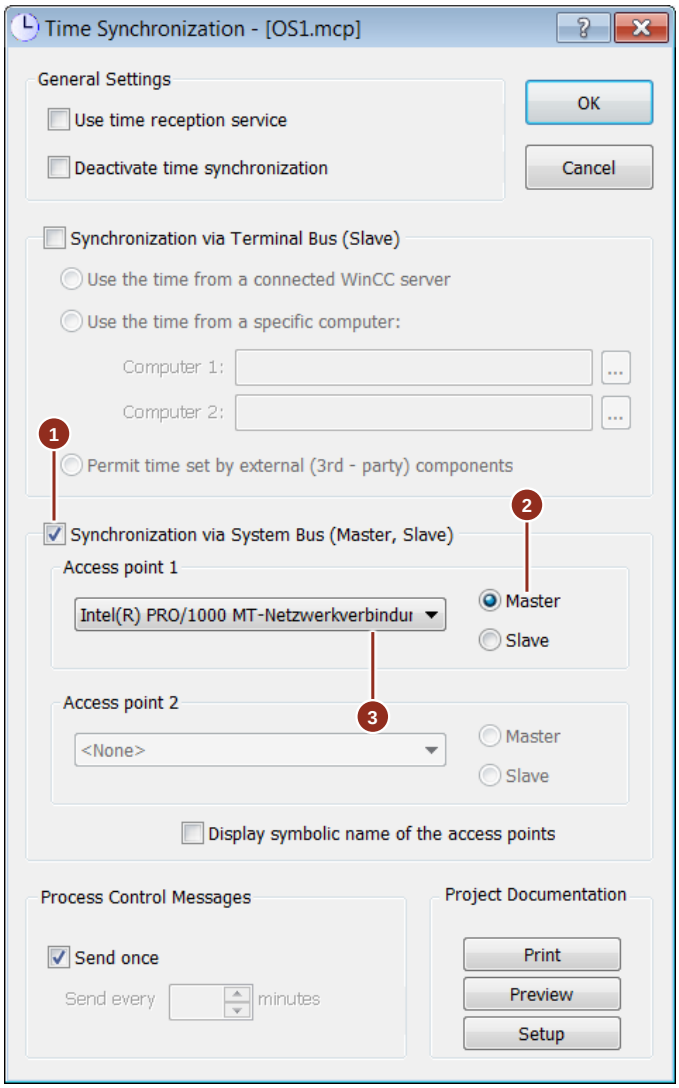
3.2.1 Synchronization with the SIMATIC method

The following sections only discuss time synchronization in the SIMATIC procedure. Please note that not all components may support clock synchronization in the SIMATIC procedure. Alternatively, the NTP procedure can be used. The operator panels do not support either of the two procedures. These are synchronized using an area pointer. The controller must make the current system time available to the area pointer.

The OS server is the time-of-day master. OS clients and automation systems are slave clocks. Operator panels are synchronized with the AS using an area pointer. The time should be set to Coordinated Universal Time (UTC) throughout the entire system.

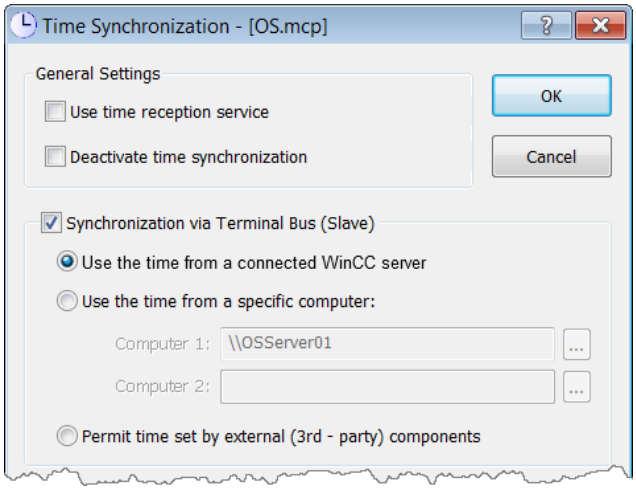
Setting up the time-of-day master

1. Open the OS project for the server that is to be configured as time-of-day master.
2. Open the "Time Synchronization" editor.
3. Select the option "Synchronization via System Bus". (1)
4. Set an Access point (2) and define this as "Master" (3). Here, select the CP for your system bus.
5. If necessary, you can configure a further access point as "Master".
6. Save the changes and load the OS.



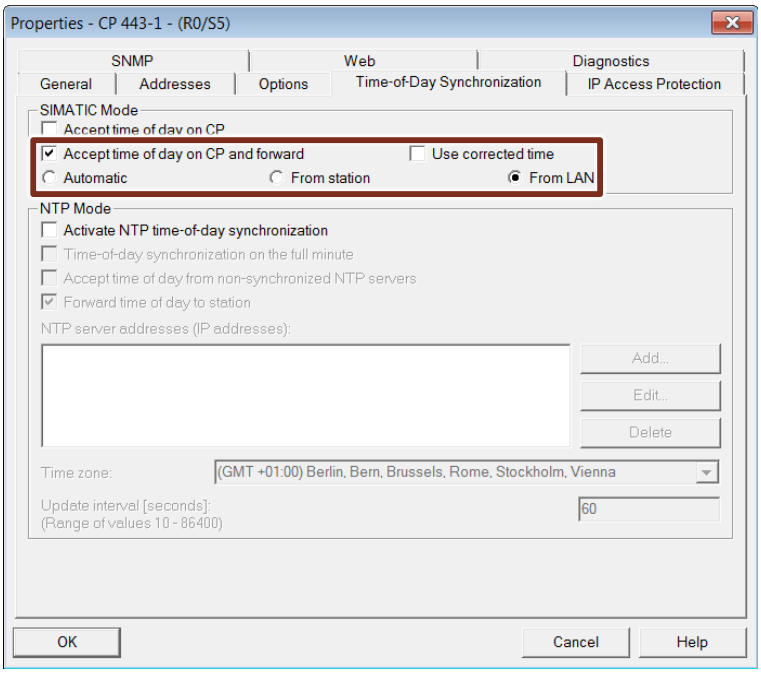
Configurating the time synchronization of the OS client

1. Open the OS client projects in succession.
2. Open the "Time Synchronization" editor.
3. Select the option "Synchronization via Terminal Bus".
4. Select the option "Use the time from a connected WinCC server".
5. Save the changes and load the OS.



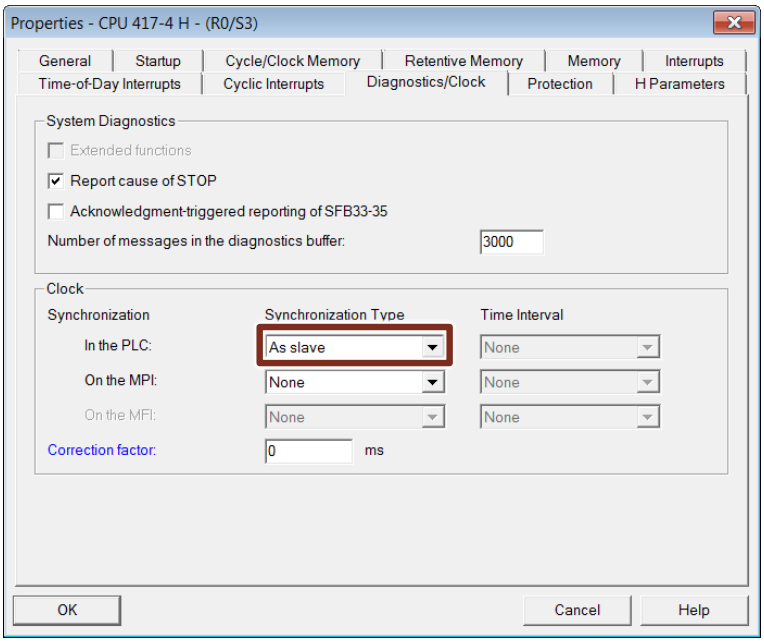
Time synchronizations of the automation systems

6. Open the hardware configuration for the AS to be configured.
7. Open the properties for the CP and switch to the "Time-of-Day synchronization" tab.
8. Select the option "Forward time of day" in the "SIMATIC Mode" group box.



9. Open the properties for the CPU and switch to the "Diagnostics/Clock" tab.

10. Select the synchronization type "As slave" in the AS.
11. Save and compile the changes and load the hardware configuration



3.2.2 Synchronization in the NTP procedure

In the NTP procedure, the clock time is provided by a Windows PC which is connected both to the system bus and to the terminal bus. The NTP server is configured from the management console of the operating system.

You can find a detailed description of how to configure the time synchronization using the NTP procedure in the following article:

http://support.automation.siemens.com/WW/view/en/61931975

Alternatively, a central system clock can be configured as NTP server.

3.2.3 Synchronization of the operator panel

To perform time synchronization for the operator panels, you need the following:

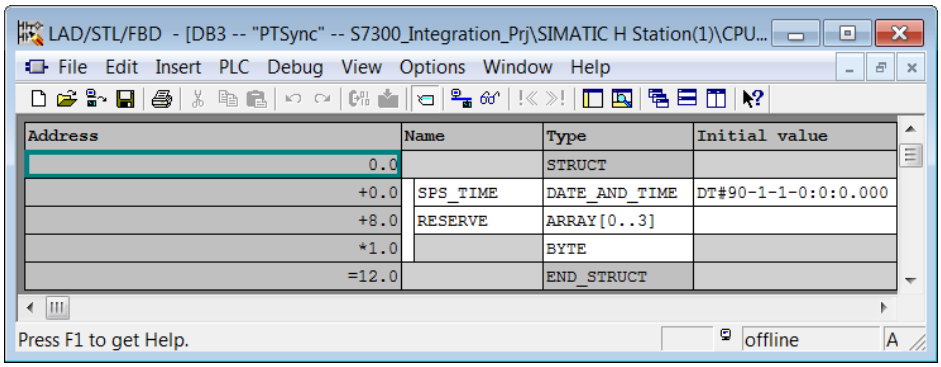
- The system function block "READ_CLK"
- A 12-byte data block
- The area pointer "Date/time PLC" for the operator panel

Creating a data block

The panel area pointer requires a data range with a total length of 12 bytes. Create a data block with the following parameters:

- a parameter of type "DATE_AND_TIME".
- four reserve bytes

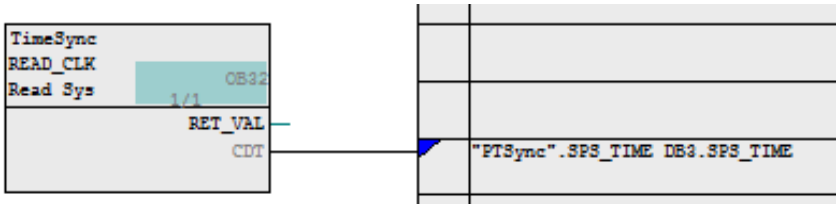
Figure 3-1



Reading out the time

By means of the SFC "READ_CLK" the time is read out and written into the parameter "SPS_TIME" of the DB.

1. Create a new CFC chart.
2. Add the SFC "READ_CLK" to the chart.
3. Connect the output "CDT" with the parameter "SPS_TIME" of the DB.



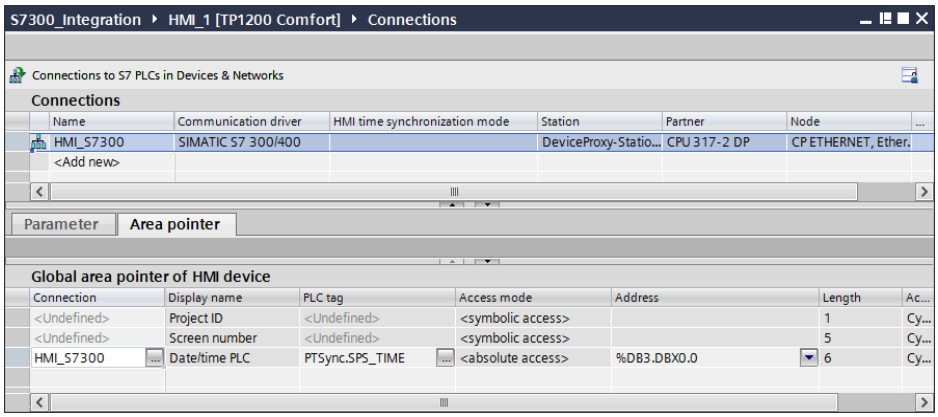
4. Compile and load the control program.

Configuring the area pointer

The area pointer is configured in the TIA Portal with an existing connection to the controller, which should be the time-of-day master for the panel.

1. In the TIA project, open the connections of the panel to be synchronized.
2. Switch to the "Area pointer" tab.
3. Configure the area pointer "Date/time PLC" with the connection and the address of the previously created data block.

   Figure 3-2



4. Compile and download the changes in the OS.

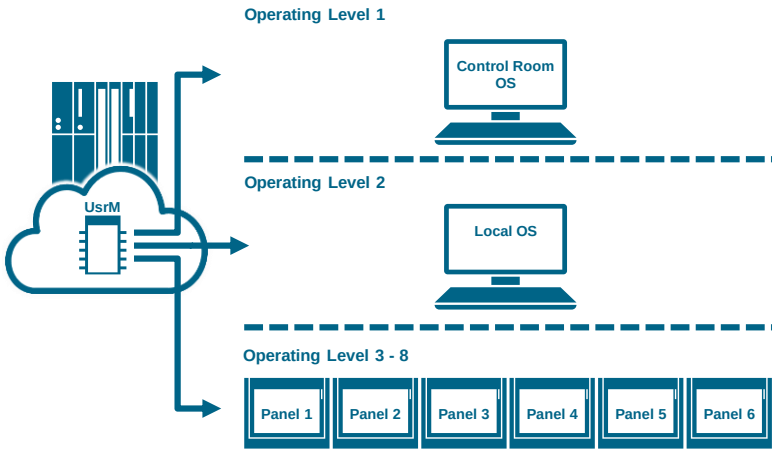
Note

Panels always display the UTC timestamp generated by S7-300/400 controllers for messages. They therefore do not contain any possibility of distinguishing between UTC (system time) and local time.
WinCC Comfort or Advanced also use the UTC timestamp generated by the PLC and do not distinguish between system time and local time.

3.3 Hierarchical operation

In order to avoid inconsistencies caused by operation from different locations, the local operator authorization for the APL has been extended for multiple control room operation. The concept envisages, for instance, 2-stage hierarchical operation. Levels 1 and 2 are intended for operation at the OS in the central control room, while Levels 3 to 8 are for operation at the Comfort Panel locally in the plant. However you can also configure the 8 available input levels individually.

Figure 3-3

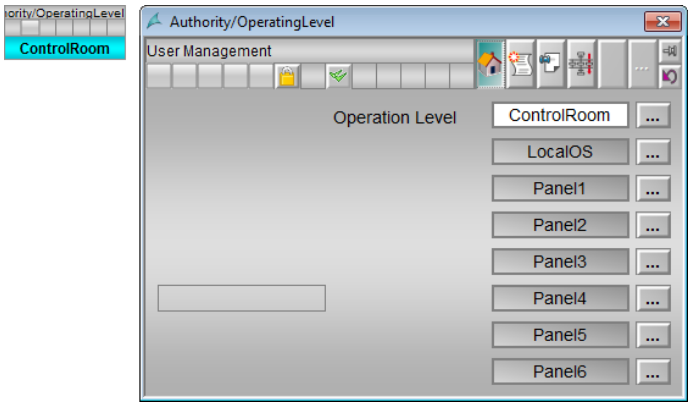


The "S7UsrM" block (= User Manager) is built into the control program in order to manage the input levels, and is connected to the interface blocks of the "IL for S7" library. The interface blocks pass the signal on to the associated block.

The input level is selected using the faceplate on the OS or via the connection to the input "KeySwLvl" (= Key Switch Level). When the user administration is activated, a logged-in user with "higher order process operation" access rights is required for operator input at the faceplate.

As of the Industry Library V8.2, an interface module for the operator panels is also available. This means that the operation can also be managed via the operator panel.

Figure 3-4



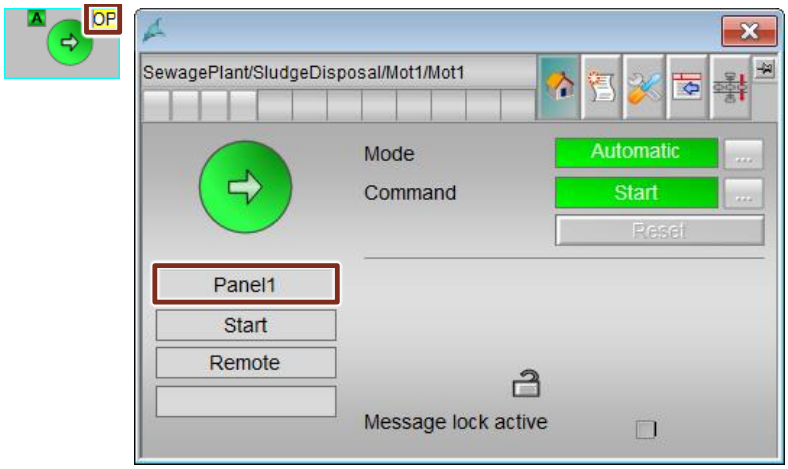
The input level is set at the OS using the internal tag "@Permission". The input level for the Comfort Panels is predefined at the interface blocks with the input parameter "OP_PERMIS".

Display on the faceplate

Which station currently has the operating authority is displayed on the block icon and in the OS faceplate.

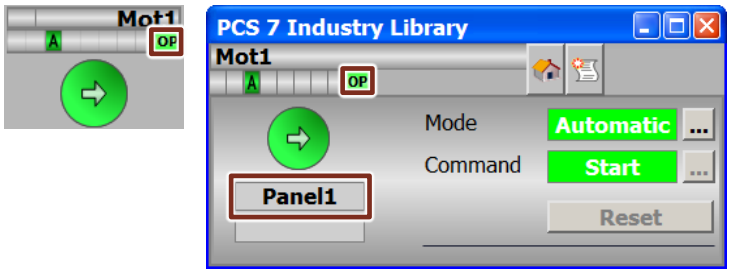
The text created in the enumeration is displayed on the faceplate.

Figure 3-5



As with the display on the OS, the selected authorization level is also displayed on the faceplates of the operator panel.

Figure 3-6

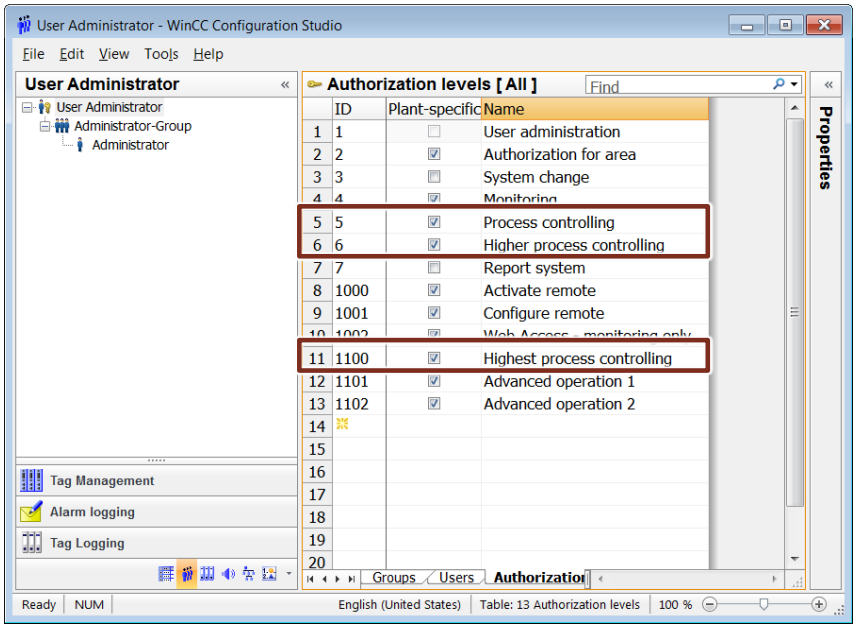


3.4 Operator authorization and user configuration

The PCS 7 faceplates use three authorization levels as standard for process operation. These are:

- Level 5: Operator inputs
  Normal operations can be carried out, e.g. switchover from manual to automatic.
- Level 6: Higher order operator inputs
  It is possible to carry out operations that have long-term effects on the process; e.g. adapting the limit values for a closed-loop controller.
- Level 1100: Highest order operator inputs
  Process values can be simulated and equipment can be released for servicing.

Figure 3-7



The faceplates on the operator panel are configured in such a way that only level 5 operations are available. Higher and highest order operator inputs can only be performed on the OS.

If you want to further restrict access to the operator panel, you have the following options for setting up a user administration system:

- in the project of the operator panel or
- using SIMATIC Logon.

Note

Further information about user hierarchies in PCS 7 can be found in the manual "SIMATIC Process Control System PCS 7 OS Process Control (V9.0 SP1)".
https://support.industry.siemens.com/cs/ww/en/view/109754981

The procedure for configuring user administration can be found in the documentation for PCS 7 WinCC Comfort and SIMATIC Logon.

3.5 Process fault diagnostics

The interface blocks of the "IL for S7" library are configured with the alarm signaling function "ALARM_DQ".

For the bit message procedure, the non-message-type variants are set up to show messages on the operator panel. However, more configuration effort is required for the panel project.

The message-type variant has the advantage that the operator can display and acknowledge the messages from both the OS and the operator panel.

The standard version does not provide for operation messages to be generated on the operator panel. However, this kind of operation messaging can be configured by connecting the control signals of the interface block to the inputs for external messages.

In contrast to the PCS 7 standard signaling block "Alarm_8P", the signaling function "Alarm_DQ" is also available on HMI devices based on S7-300 and on WinCC Comfort V14. However, "Alarm_DQ" can only generate one message per call.

Quantity structure for alarms and messages:

Table 3-4

	PCS 7 with S7-400	PCS 7 with S7-300
Message block	ALARM_8P / ALARM_DQ	ALARM_DQ
Number of messages	Up to 1000	Up to 300

Note

Further information on the alarm blocks can be found in the manual "System and Standard Functions for S7-300/400".

https://support.industry.siemens.com/cs/ww/en/view/109751826

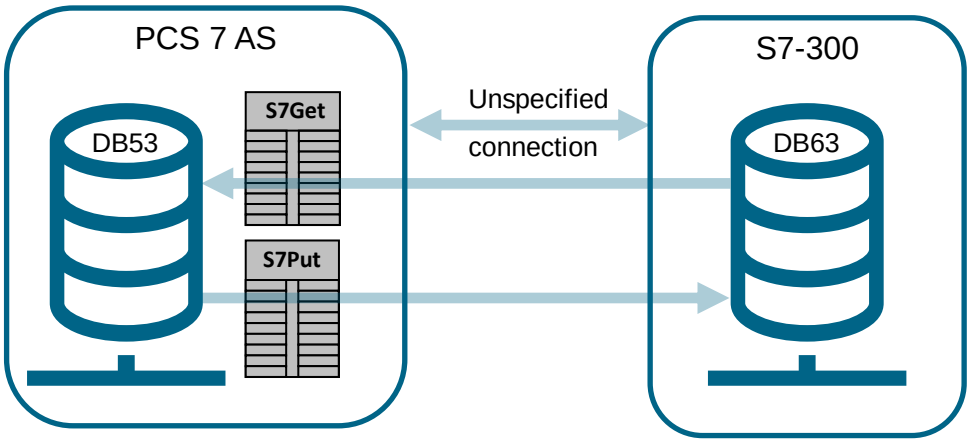
4 S7-400-side communication

4.1 Description of the core functionality

In this example the communication blocks "S7Put" and "S7Get" from the IL S7 library are used. These are built into the S7 program of the AS and supply a DB of the AS program with the necessary data of the S7-300. The processing of these data then takes place under your own responsibility. The configuration of the time synchronization and the hierarchical operation play no role in this chapter.

By means of the block "S7Get" the values of a DB are read out from a S7-300 CPU and transferred into the DB of an S7-400 CPU of the PCS 7 system. The processing of the data takes place in the S7-400 and is written back to the DB of the S7-300 using the block "S7Put".

Figure 4-1

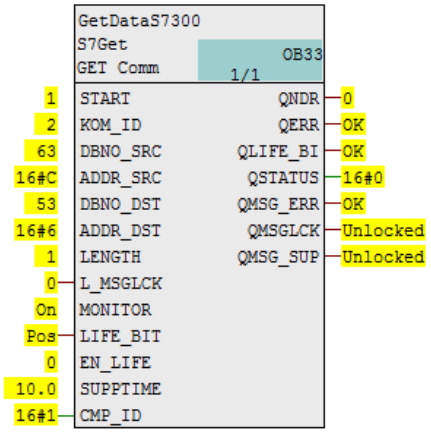


Note The blocks "S7Put" and "S7Get" themselves are message-capable and transmit messages about the connection status to the OS. By processing the data from the data block in the AS, the sub-process unit can be visualized in a simple way.

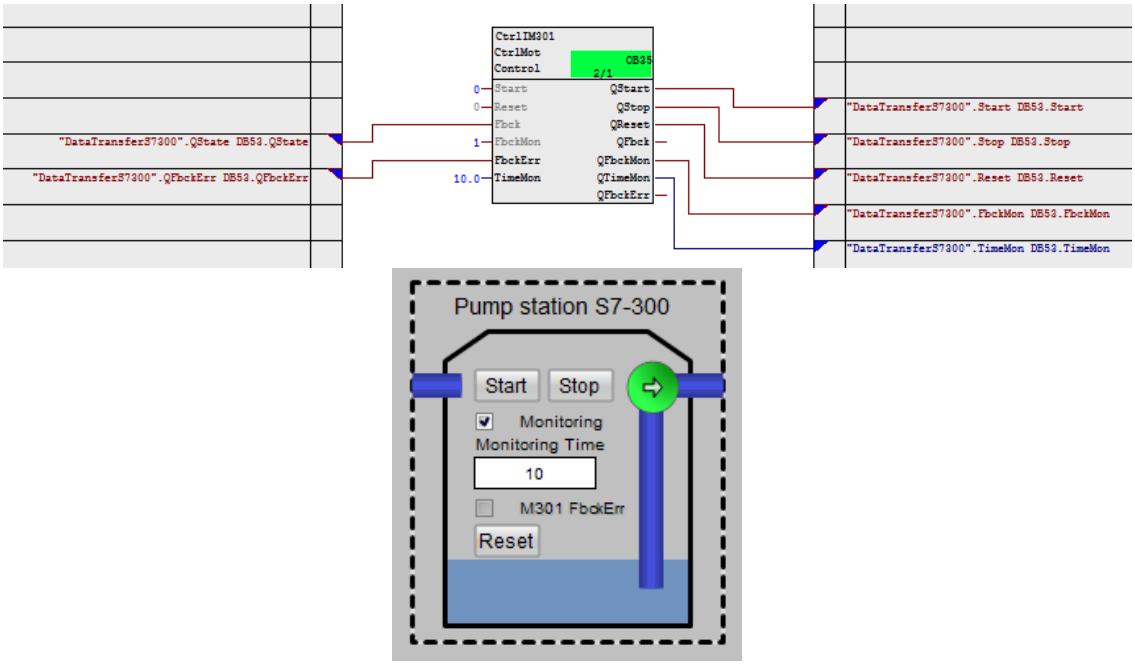
Core functionality process

The core functionality of the S7-400 side communication is briefly summarized here. Detailed configuration is carried out in the following subchapters

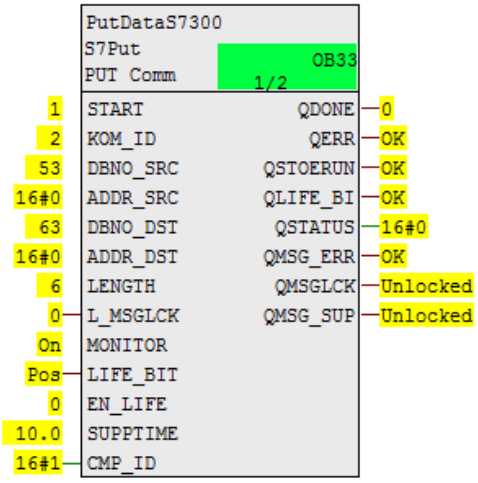
1. The values of the DB of the S7-300 CPU are transferred to a DB of the AS using the block "S7Get".



2. In the AS of the PCS 7 system, the read-in process values are then processed and displayed and operated on the OS.



3. The current values are written back to the S7-300 CPU. The block "S7Put" is used for this purpose.



Advantages of this solution

The configuration of the sub-process unit does not have to be changed. Only the data block of the S7-300 that contains the data to be processed must be known. No special block library must be installed on the configuration computer for the S7-300 controller.

4.2 Hardware and software components used

The application has been created with the following components:

Hardware components

Table 4-1

Components	Qty.	MLFB/Order number	Note
CPU 417-4H	2	6ES7 417-4HT14-0AB0	
CP 443-1	2	6GK7 443-1EX11-0XE0	
CPU 317-2 DP	1	6ES7-317-2AJ10-0AB0	
CP 343-1	1	6GK7 343-1EX20-0EX0	

Standard software components

Table 4-2

Components	Qty.	MLFB/Order number	Note
PCS 7 V9.0 SP1	1	6ES7-658-1AF08-0YA6	
Industry library V9.0 Upd1	1	6DL5410-8AX58-0YA0	
STEP 7 Professional V14 SP1 Upd6	1	6ES7822-1AA04-0YA5	

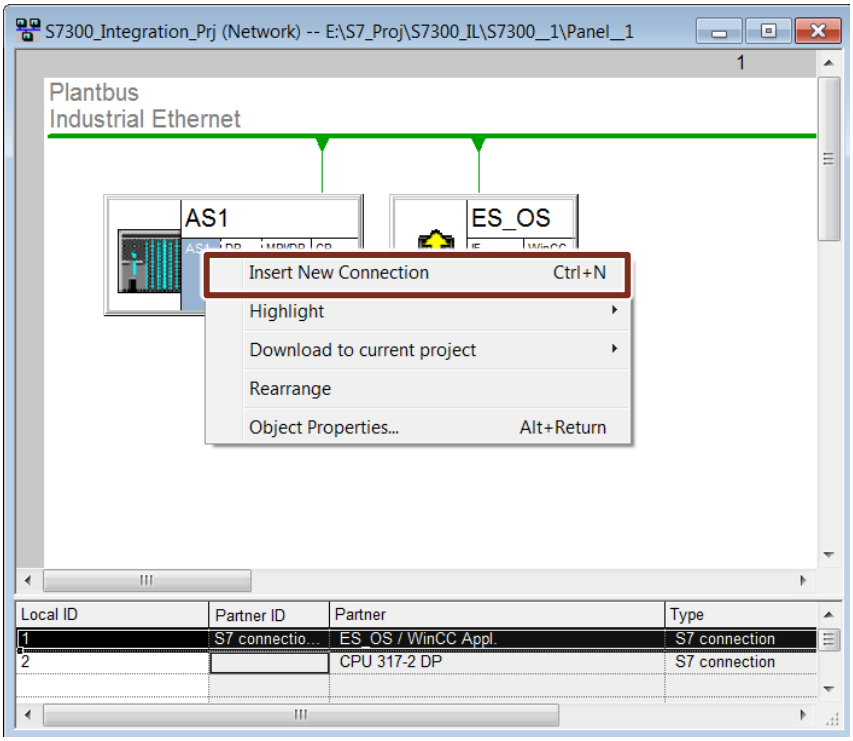
4.3 Configuration with an S7-400 single CPU

4.3.1 Configuration of the unspecified S7 connection

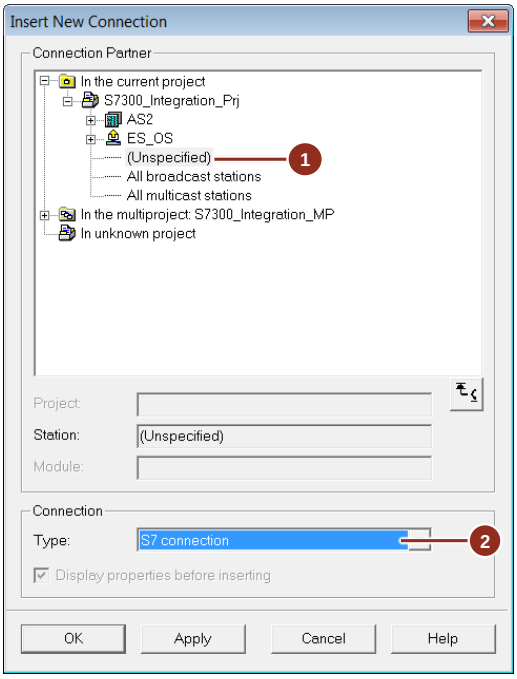
Make sure in advance that there is a physical connection between the two system networks or that both CPUs are located in the same system network. It is not important which type of connection you establish (Profibus or Industrial Ethernet), the difference lies only in the selection of the interface and in the addressing. To establish a connection from an AS to an S7-300 CPU, proceed as follows.

Procedure

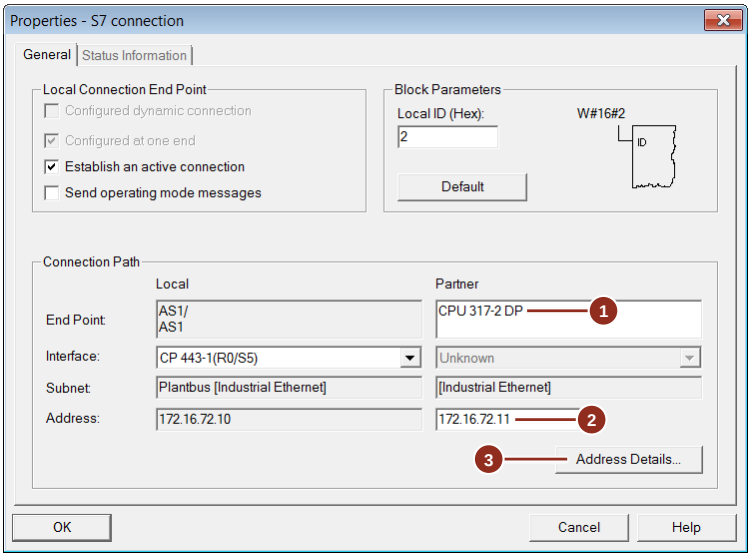
1. Open the "NetPro" editor of the existing PCS 7 project.
2. Mark the CPU with which you want to establish a connection to the S7-300 and select the entry "Insert New Connection" in the context menu.



3. Select the entry "Unspecified" (1) as the connection partner in the PCS 7 project. Select "S7 connection" (2) as the connection type.
4. Confirm your selection with "OK".

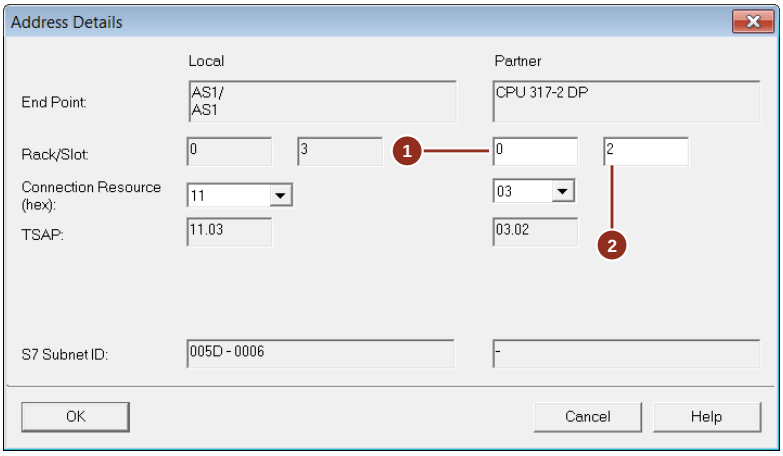


5. In the dialog "Properties - S7 connection" configure a name (1) and the network address of the connection partner (2). The local ID is set automatically and does not need to be changed. This ID is later used in the S7 program to configure the communication blocks.



6. Click the "Address Details..." button (3).

7. Under Address details you configure the rack number (1) and the slot of the partner CPU (2). The default connection resource "03" ("Connection Resource (hex)") stands for a one-way connection with an unspecified connection partner.



8. Confirm all settings and save/compile and load the connections.

4.3.2 Creating a data block

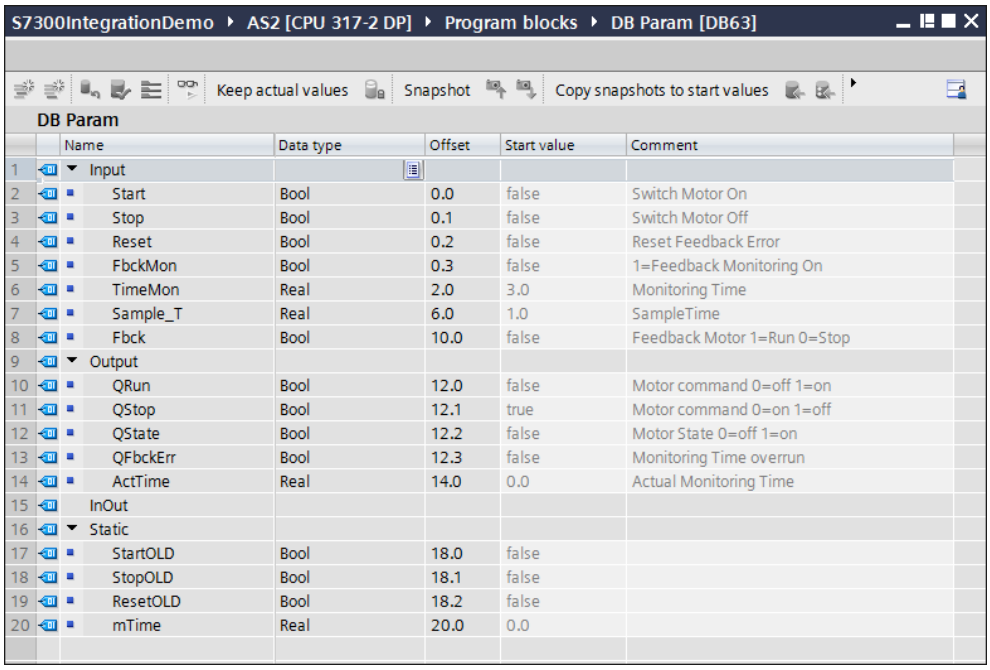
In the S7 program of the AS, the data of the read DB are processed and the result is written back again. To transfer the data correctly from the S7-300 CPU, you need a user-defined DB in the AS that corresponds to the data areas of the S7-300 to be read/written.

NOTICE	**If the block "S7Put" is used, the data is written to the data blocks of the S7-300 without checking their validity. This must be taken into account when configuring the program. Unforeseen system states may occur.** **In addition, the values are overwritten if the target block is interconnected. Connected block inputs and outputs should not be overwritten with "S7Put".**

Configuration example

In the S7 program of the S7-300, a function block was created to control a simple motor. The associated data block has the following parameters as shown in the figure.

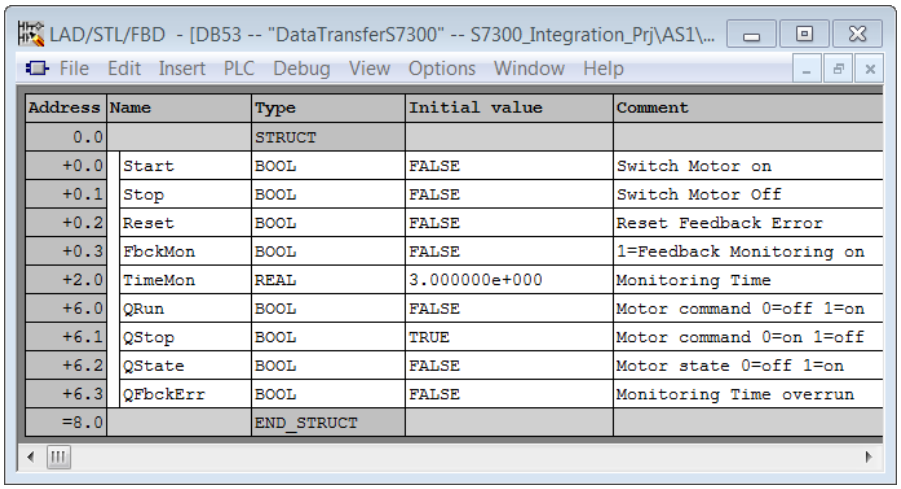
Figure 4-2



	Name	Data type	Offset	Start value	Comment
1	Input				
2	Start	Bool	0.0	false	Switch Motor On
3	Stop	Bool	0.1	false	Switch Motor Off
4	Reset	Bool	0.2	false	Reset Feedback Error
5	FbckMon	Bool	0.3	false	1=Feedback Monitoring On
6	TimeMon	Real	2.0	3.0	Monitoring Time
7	Sample_T	Real	6.0	1.0	SampleTime
8	Fbck	Bool	10.0	false	Feedback Motor 1=Run 0=Stop
9	Output				
10	QRun	Bool	12.0	false	Motor command 0=off 1=on
11	QStop	Bool	12.1	true	Motor command 0=on 1=off
12	QState	Bool	12.2	false	Motor State 0=off 1=on
13	QFbckErr	Bool	12.3	false	Monitoring Time overrun
14	ActTime	Real	14.0	0.0	Actual Monitoring Time
15	InOut				
16	Static				
17	StartOLD	Bool	18.0	false	
18	StopOLD	Bool	18.1	false	
19	ResetOLD	Bool	18.2	false	
20	mTime	Real	20.0	0.0	

A DB containing the required parameters must then be created in the S7 program of the AS. The following DB was created in the AS program.

Figure 4-3



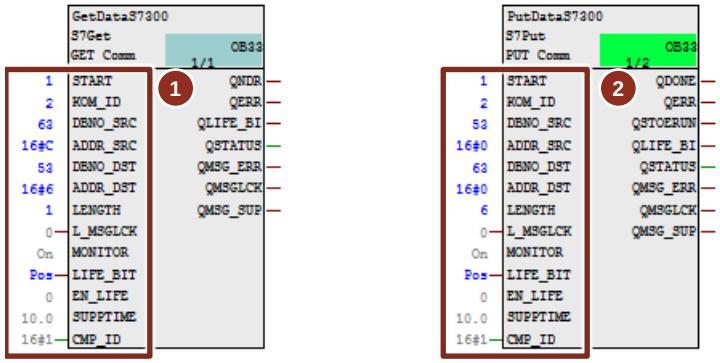
Address	Name	Type	Initial value	Comment
0.0		STRUCT		
+0.0	Start	BOOL	FALSE	Switch Motor on
+0.1	Stop	BOOL	FALSE	Switch Motor Off
+0.2	Reset	BOOL	FALSE	Reset Feedback Error
+0.3	FbckMon	BOOL	FALSE	1=Feedback Monitoring on
+2.0	TimeMon	REAL	3.000000e+000	Monitoring Time
+6.0	QRun	BOOL	FALSE	Motor command 0=off 1=on
+6.1	QStop	BOOL	TRUE	Motor command 0=on 1=off
+6.2	QState	BOOL	FALSE	Motor state 0=off 1=on
+6.3	QFbckErr	BOOL	FALSE	Monitoring Time overrun
=8.0		END_STRUCT		

To be able to control the motor from the AS, the parameters "QRun, QStop, QState and QFbckErr" are read with "S7Get" and the parameters "Start, Stop, Reset, FbckMon and TimeMon" are written to the S7-300 with "S7Put".

4.3.3 Configuring communication blocks

In this example, the blocks "S7Put" and "S7Get" from the Industry Library are used for communication between the CPUs. The following steps show how these are inserted and configured in the S7 program of the AS.

1. Add the blocks "S7Get" and "S7Put" from the Industry Library S7 to a CFC chart in your master data library.
2. Open an existing or new CFC chart in your technological hierarchy.
3. Insert the blocks "S7Get" and "S7Put" from your master data library into your CFC chart.
4. Determine the local ID of the unspecified S7 connection and the DB number of the partner station. The local ID can be found in the "Properties - S7 Connection" dialog in the "Block Parameters" area. To determine the number of the DB, open the TIA project of the S7-300.



Note To keep the communication load in the network low, the blocks should be called by a wake-up interrupt OB with a longer cycle time (e.g. OB33 with 500ms).

5. Configure the block "S7Get" with the determined values (1).
   - KOM_ID = 2 (Connection ID)
   - DBNO_SRC = 63 (Number of the source DB)
   - ADDR_SR = 16#C (Data area from byte 12)
   - DBNO_DST = 53 (Number of the target DB)
   - ADDR_DST = 16#6 (Data area from byte 6)
   - LENGTH = 1 (1 byte was transmitted)
6. Configure the block "S7Put" with the determined values (2).
   - KOM_ID = 2 (Connection ID)
   - DBNO_SRC = 53 (Number of the source DB)
   - ADDR_SRC = 16#0 (Data area from byte 0)
   - DBNO_DST = 63 (Number of the target DB)
   - ADDR_DST = 16#0 (Data area from byte 0)
   - LENGTH = 6 (6 bytes were transmitted)

Note

With the communication blocks "S7Put" and "S7Get", data can only be transmitted byte by byte. Source and destination data bits are always transmitted with at least 8 bits.
When creating parameters of a DB, a new data type always starts at the byte boundary (byte, boolean and char) or at the word boundary (all other data types). If you do not want to transfer all Boolean parameters of the DB, create a parameter of a different type in between.

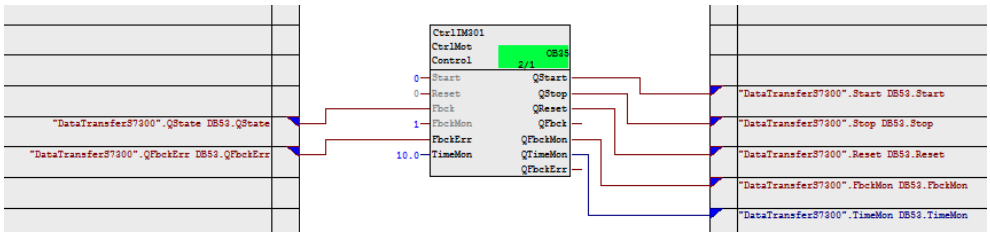
Example
First, two Boolean parameters are created, and these receive the start addresses 0.0 and 0.1. These are followed by a parameter of the type "byte" with the start address 1.0. Two further parameters of the "Bool" type are assigned addresses 2.0 and 2.1. The data block has a total length of 4 bytes.

4.3.4 Program logic and visualization

You can process the DB parameters directly in the control program of the AS at your own discretion. To enable an operation analogous to the PCS 7 standard, you should create a suitable function block with an associated OS faceplate. Instructions for APL-compliant programming can be found in the "SIMATIC PCS 7 Process Control System APL Style Guide" manual.

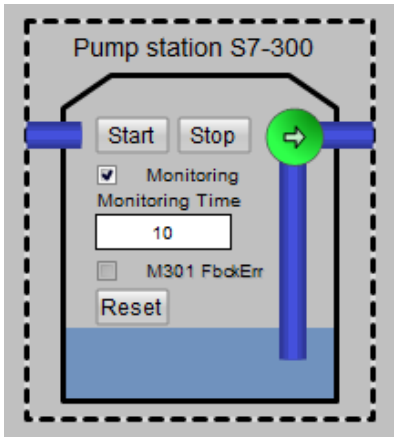
In the course of this application, a simple function block was created which creates tags for display and control on the OS and outputs a message if an error (feedback) occurs. This FB was then directly connected to the parameters of the user-defined DB. In the CFC chart, this block has the following appearance:

Figure 4-4



In the OS process image, an area for controlling the S7-300 motor has been created. This area could be represented as follows:

Figure 4-5



Alternatively, you can also use a PCS 7 standard block for the program logic. (e.g. MOTOR - FB66). However, this block has the disadvantage that not all required control signals are available as outputs, e.g. resetting an error. Therefore the button "RESET" of the OS faceplate cannot be used to reset the error at the S7-300. This function must then be implemented in another way.

4.4 Configuration with an S7-400H CPU

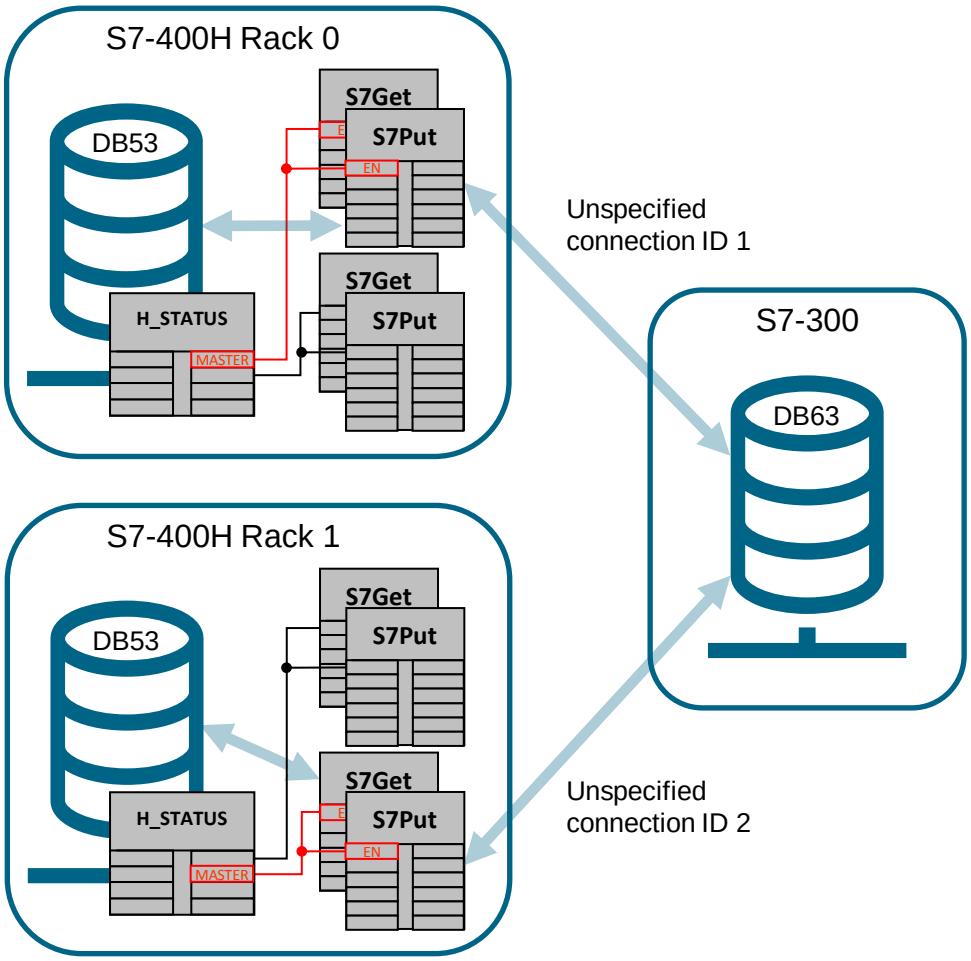
Two unspecified connections are required for the H system, since no highly available connections are available when configuring unspecified connections in the SIMATIC Manager. The "S7Put" and "S7Get" components are built into the S7 program in dual version.

The data transmission is always taken over by the station which is currently the master. The switching of the data transmission between the "S7Put" and "S7Get" blocks is done by the "H_STATUS" block. You can obtain this at the following entry.

http://support.automation.siemens.com/WW/view/en/19537149

The following diagram illustrates how it works:

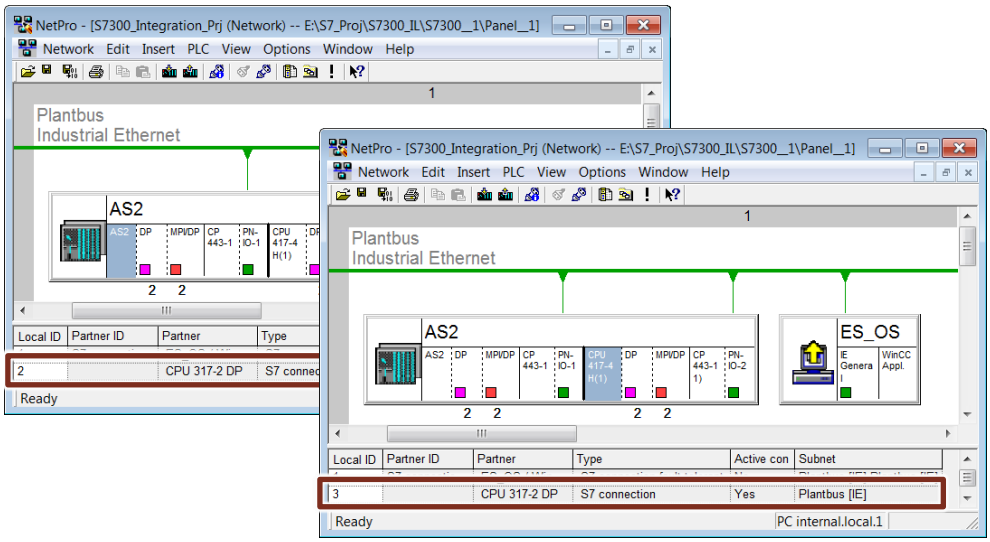
Figure 4-6



4.4.1 Configuration of the unspecified S7-400H connection

Configure one connection each for both S7-400H CPUs, as described in Chapter 4.3.1 "Configuration of the unspecified S7 connection" 4.3.1 "Configuration of the unspecified S7 connection". The configuration of the target station is identical for both connections. Each connection of the H-CPU receives its own connection ID.

Figure 4-7



4.4.2 Creating a data block

The configuration of the data block is identical to the single CPU. See the Chapter: 4.3.2 " Creating a data block".

4.4.3 Configuring the communication blocks of the S7-400H

Since the parameter "KOM_ID" for the connection ID of the "S7Put" and "S7Get" blocks cannot be changed during operation, you need these blocks twice for the H-CPU.

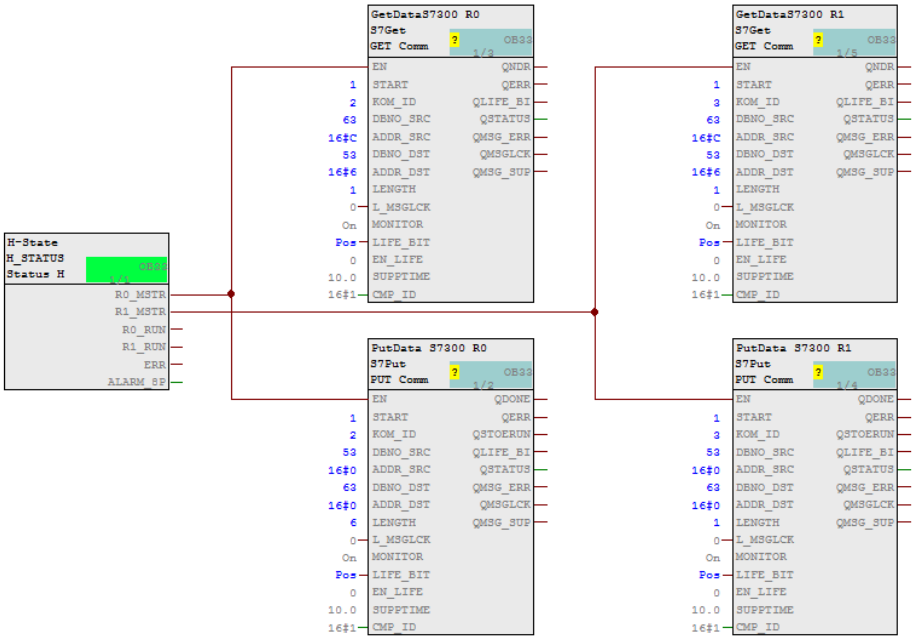
The configuration of the "S7Put" and "S7Get" blocks is identical for both connections. Only the value of the parameter "KOM_ID" differs.

The "H_STATUS" block is responsible for switching between the transmit and receive blocks. The block "H_STATUS" enables the output of the operating states RUN/STOP and MASTER/RESERVE of an H system.

Procedure

1. Insert the blocks "H_STATUS", "S7Put" and "S7Get" into the CFC chart.
2. Make the "EN" inputs of the "S7Put" and "S7Get" function blocks visible.
3. Configure the blocks as described in Chapter 4.3.3 "Configuring communication blocks".
4. Then copy the blocks "S7Get" and "S7Put" and configure the parameter "KOM_ID" with the correct connection ID for the second CPU in rack 1.

Figure 4-8



5. Connect the output "R0_MSTR" of the status block to the inputs "EN" of the communication blocks for the configured connection of the CPU in rack 0.
6. Connect the output "R1_MSTR" of the status block to the inputs "EN" of the communication blocks for the configured connection of the CPU in rack 1.

Note Since the "EN" input of the "S7Get" and "S7Put" blocks is connected, the block call is no longer static. This is marked with a yellow question mark.

4.4.4 Program logic and visualization

The rest of the control program and the configuration of the OS does not differ from the single CPU. Refer to Chapter 4.3.4 "Automation task".

5 Configuration of the S7-300 with Industry Library

5.1 Description of the core functionality

The package unit is created in the form of a subproject in the PCS 7 multiproject. The S7-300 CPU is configured using the Industry Library and the process data is displayed on an OS and on a connected operator panel. The actual PCS 7 program on the S7-400 CPU remains unchanged.

The program of the S7-300 controller is created with the blocks of the IL for S7 library. For this purpose, the blocks for the technological functions (e.g. motor, valve, measuring point...) are built into a CFC chart and interconnected. For visualization on the operator panel, the corresponding interface blocks are built into the CFC chart and connected to the function blocks.

In addition, a hierarchical operation is implemented This is to ensure that either the OS or the operator panel is operated.

The technological blocks use ALARM_DQ (SFC 107) to report collective errors. These messages are displayed on the OS and on the operator panel and can be acknowledged there.

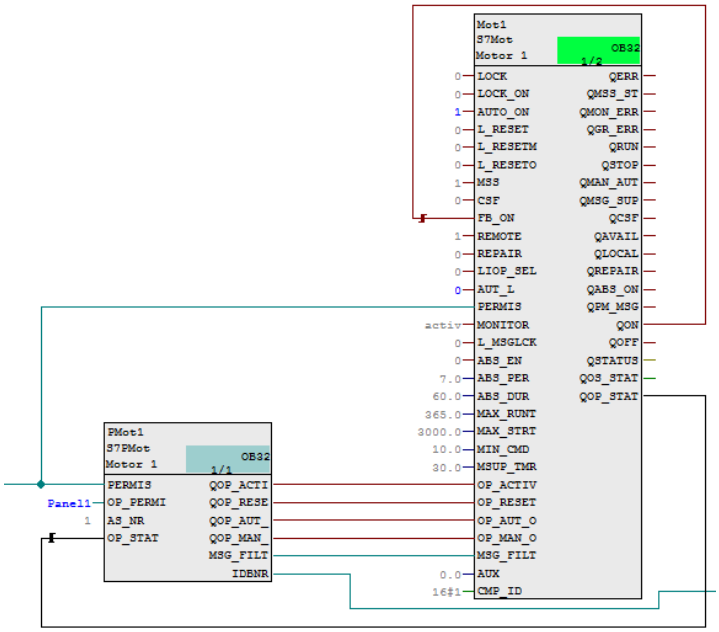
Note The concept of hierarchical operation provides for a two-level, hierarchical operation, for example. Levels one and two are provided for operator input at the OS in the central control room. Levels three to eight are for operator input locally at the operator panel in the plant. However, you can configure the eight operating levels to your own requirements.

The next section briefly summarizes the core functionality of this chapter. Detailed configuration is carried out in the following chapters.

Summary of the core functionality

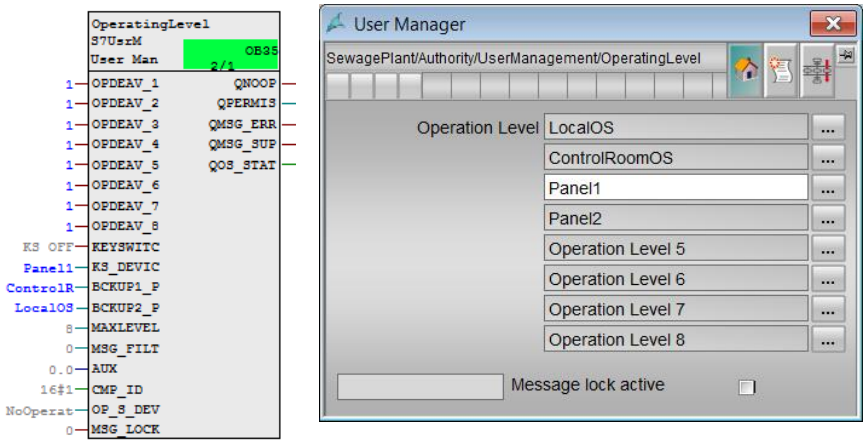
The actuators and sensors of the package unit are controlled by the program of the S7-300 CPU. The program is created using the "IL for S7" library. In addition to the technological blocks (e.g. S7Mot), interface blocks (e.g. S7PMot) for data transmission to the operator panel are installed and interconnected.

Figure 5-1



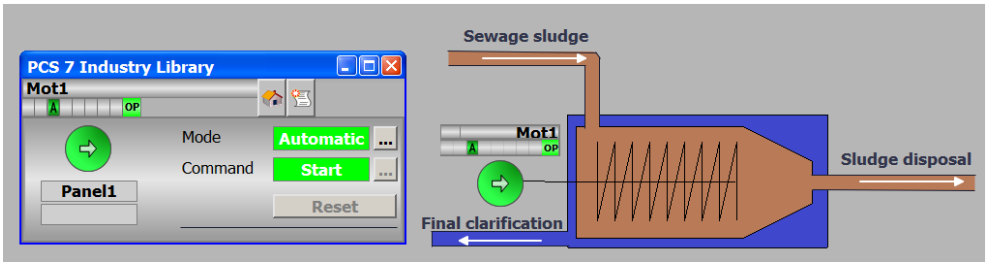
The user level is selected via the User Manager block "S7UsrM" which is connected to the technological blocks and the interface blocks. This is operated at the OS or controlled via the block input "KS_DEVICE".

Figure 5-2



The technological blocks of the IL S7 library are already equipped with a faceplate for the PCS 7 OS. With the help of the faceplate library for WinCC flexible, the package unit is configured for visualization on the operator panel in the TIA portal.

Figure 5-3



5.2 Hardware and software components used

The application has been created with the following components:

Hardware components

Table 5-1

Components	Quantity	Article number	Note
CPU 417-4 H DP	1	6ES7-417-4HT14-0AB0	
CP 443-1	1	6GK7-443-1EX30-0XE0	
CPU 317-2 DP	1	6ES7-317-2AJ10-0AB0	
CP 343-1	1	6GK7-343-1EX20-0XE0	
TP1200 Comfort	1	6AV2-124-0MC01-0AX0	

Software components

Table 5-2

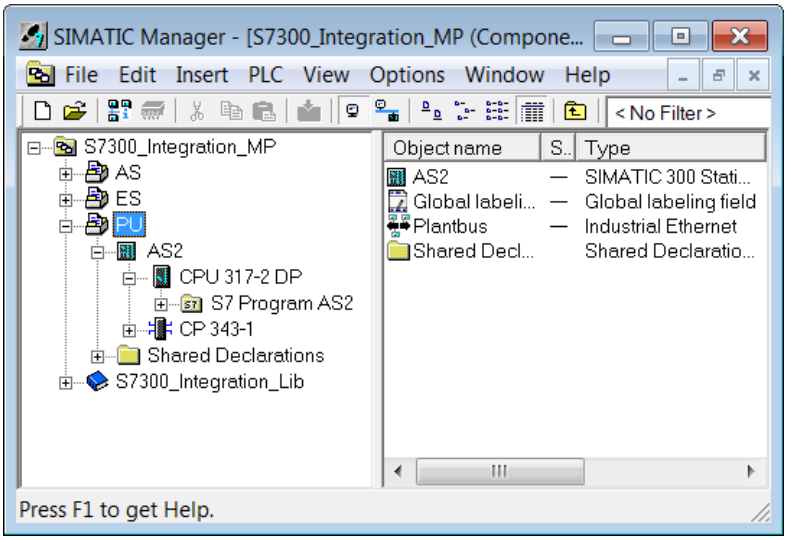
Components	Quantity	Article number	Note
PCS 7 V9.0 SP1	1	6ES7 658-5AX58-0YA5	
PCS 7 Industry Library V9.0 Upd1	1	6DL5-410-8AA08-0YA0	
STEP 7 Professional V14 SP1 Upd6	1	6ES7822-1AA04-0YA5	
WinCC Comfort V14 Sp1 Upd6	1	6AV2 101-0AA04-0AA5	

5.3 Configuration and project planning of the package unit

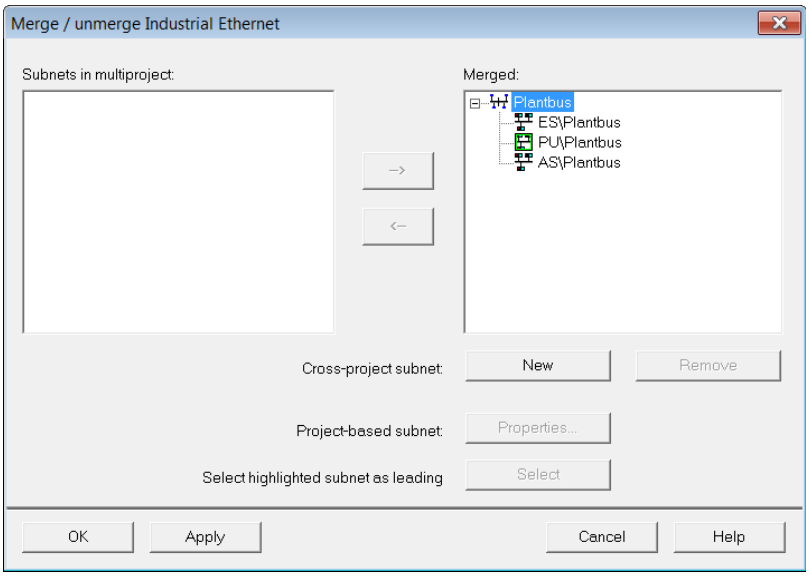
5.3.1 Creating a new project for the package unit

Procedure

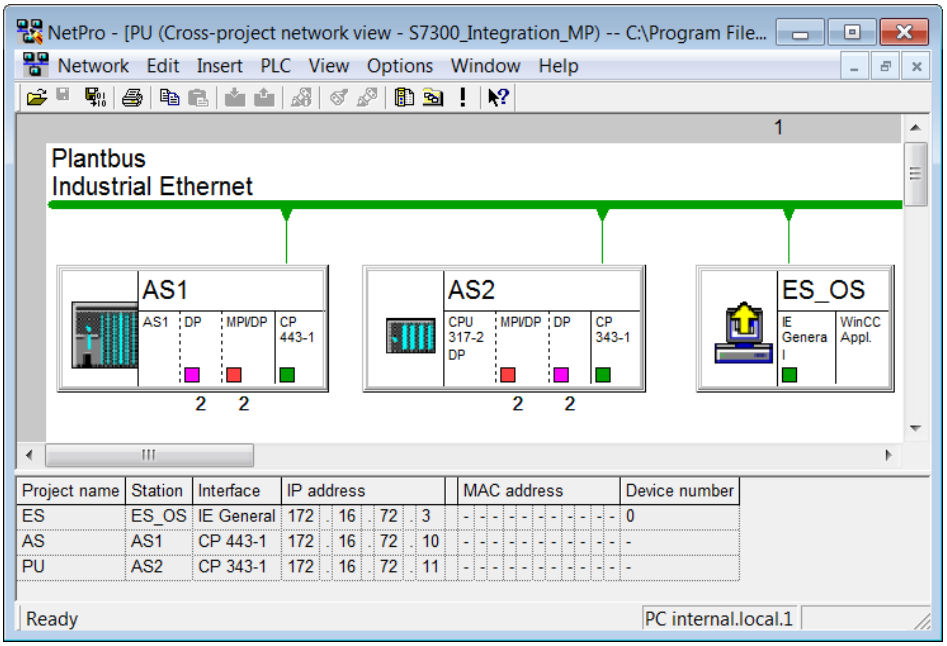
1. Open the existing PCS 7 multi-project.
2. Create a project containing the hardware and the program of the package unit. Use the menu command "File > Multiproject > Insert into Multiproject..."



3. Configure the SIMATIC 300 station according to the conditions of your automation system.
4. Merge the subnets of the multiproject. Open NetPro and select the menu command "Edit > Merge / Unmerge Subnets > Ethernet Subnets...".



5. After merging the subnets, you can display the cross-project network view in NetPro. To do this, select the menu command "View > Cross-Project Network View".



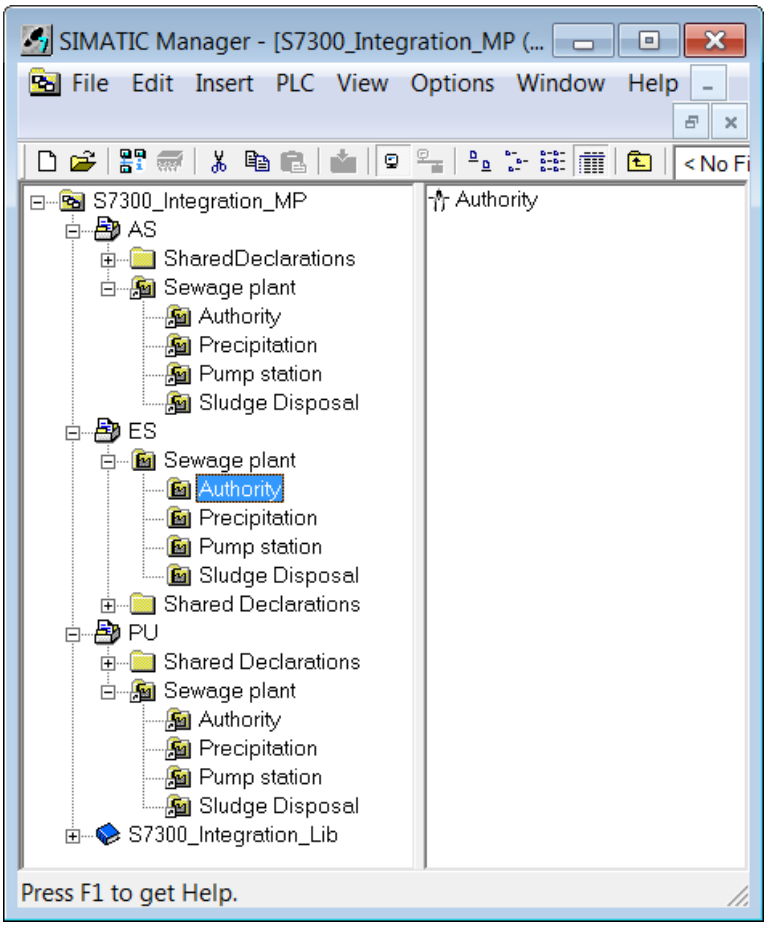
5.3.2 Configuring a technological hierarchy

By default, the technological hierarchy is the same in each subproject of the PCS 7 multiproject. As a rule, the TH is created in the OS project and then transferred to the AS projects using the "Adjust in multi-project" function.

This section describes the hierarchical operation of the package unit in a separate OS area. The actual function of the package unit is also displayed in an existing area.

Procedure

1. Add a new hierarchy folder at the level of the OS area.
2. Create a new OS image in this folder.
3. With the function "Update in the Multiproject..." you transfer the technological hierarchy to the AS projects.



5.3.3 Create S7 program

The following steps show how to configure a motor (S7Mot) of the "IL for S7" library so that it is displayed at the OS and at the operator panel. The connection to the periphery or further signal processing is carried out at your own discretion.

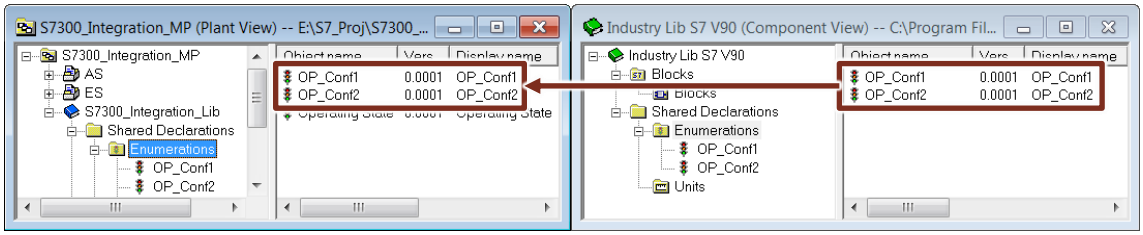
The motor block is connected to the block "S7UsrM" so that the operating level (operator panel or OS) can be selected.

Apply enumerations

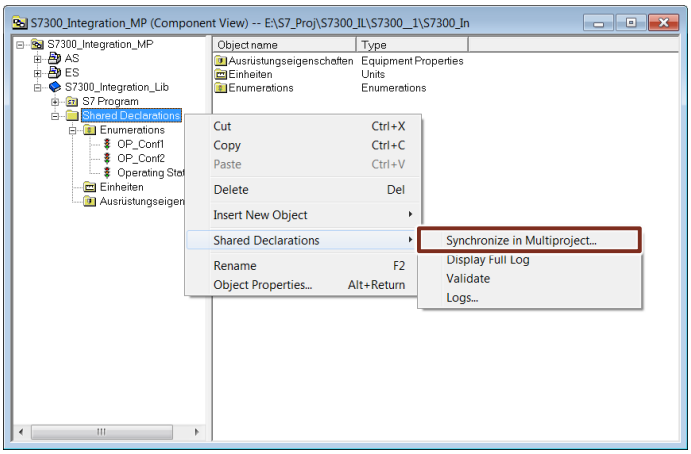
The blocks of the IL S7 library are preconfigured at the connections for the operating level with the enumeration "OP_Conf1" and "OP_Conf2". This has the advantage that the name of the operating level is displayed instead of a numeric value at the block connections in the CFC chart. In addition, the text references are created on the OS and displayed on the icon and on the faceplate You can name the operating levels as you please.

The enumerations are available in the Industry Library:

1. Copy the two enumerations "OP_Conf1" and "OP_Conf2" into your master data library.



1. Synchronize the global declarations in the multi-project.



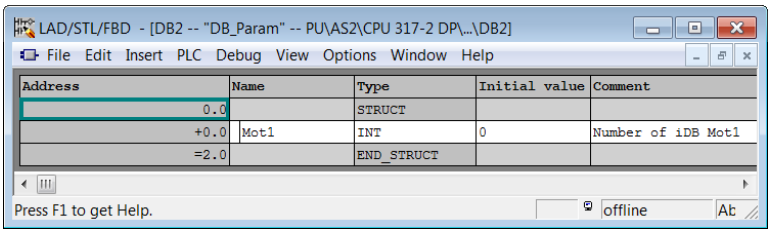
The two enumerations are now available in the multi-project.

Creating a data block

Create a data block in the S7-300 program. This block later serves as a container for parameters containing the instance data block numbers of the function blocks used (e.g. panel blocks).

1. Switch to the "Blocks" folder of the S7-300 program.
2. Create a new data block. Make sure that you assign a number that is not used by the CFC compiler. The settings for reserved ranges of other applications can be found in the CFC Editor under the menu function " Extras > Settings > Compile/Load...".

Figure 5-4

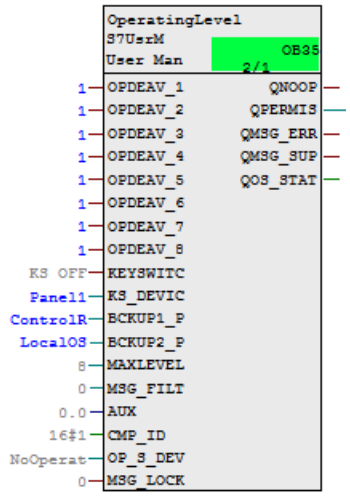


3. Configure a parameter of type "INT".

Note For additional function blocks, you can simply create an additional parameter in the data block and use it as described below.

Configuring S7UsrM

1. In the plant view, change to the project of the S7-300 CPU.
2. Create a new CFC chart in the folder for the operating authorization (in the example "Authority").
3. Insert the block "S7UsrM" into this CFC chart.



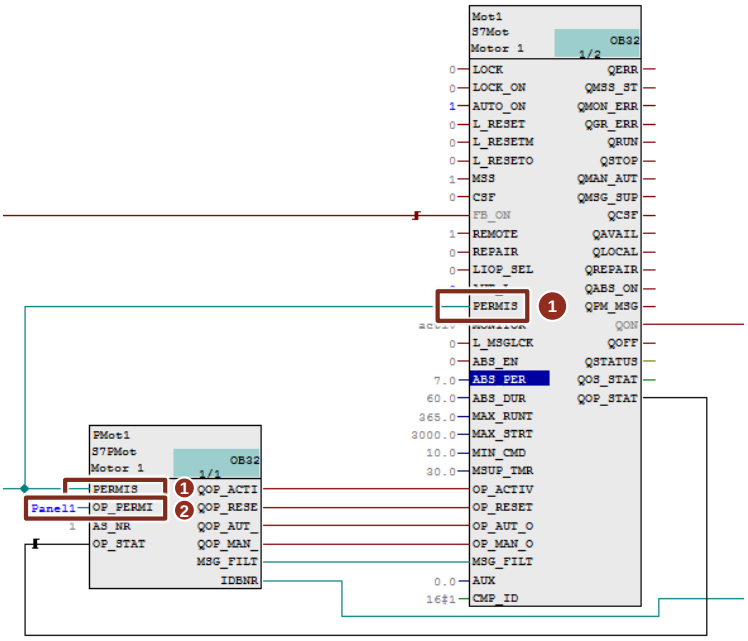
1. Define the selectable operating levels at the inputs "OPDEAV_1" to "OPDEAV_8".
2. At the "KEYSWITCH" input, you can select whether the operating level can be selected at the OS or whether it is specified at the "KS_DEVICE" block input.

3. Set the number of activated levels (OPDEAV_1 ... OPDEAV_8) at the input "MAXLEVEL".

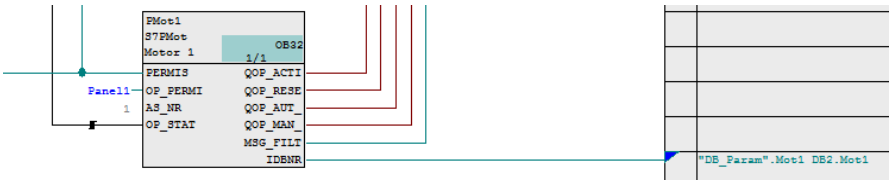
Controlling a motor

Create the function for controlling a motor in the program of the S7-300 CPU.

1. Create a CFC chart in the required folder of the TH.
2. Add the blocks "S7Mot" and "S7PMot" to the chart.



3. Connect the inputs PERMIS (1) of the blocks "S7PMot" and "S7Mot" with the output "QPERMIS" of the "S7UsrM" block.
4. Configure the input "OP_PERMIS" on the block "S7Pmot" with the operating level 3 (Panel 1) (2).
5. Connect the outputs "QOP_Active", "QOP_RESET", "QOP_AUT_ON", "QOP_MAN_ON", and "MSG_FILTER from the "S7PMot" block to the corresponding inputs of the "S7Mot" block.
6. Connect the output "IDBNR" with the parameter Mot1 in the data block "DB_Param".

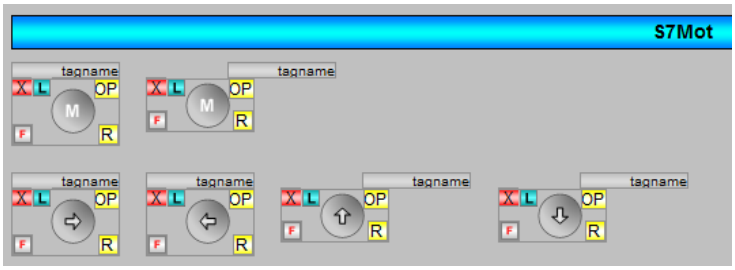


7. Compile the program and download it to the CPU.

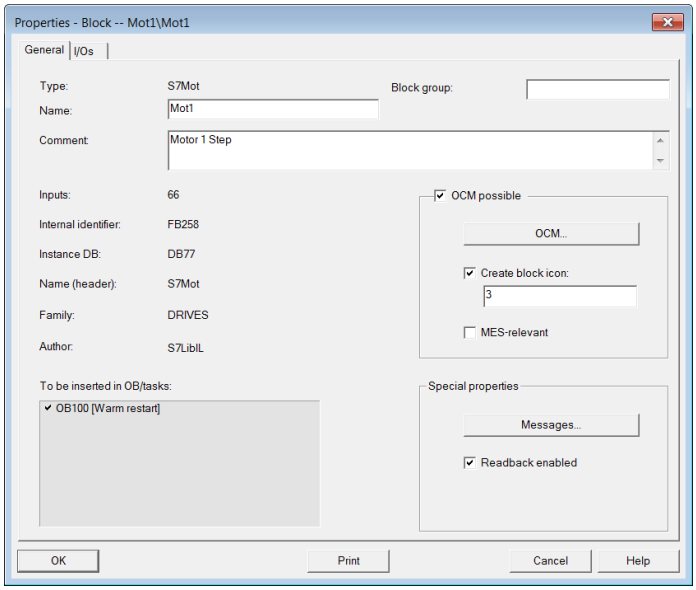
5.4 Configuring the OS

By default, the icon "@S7Mot/1" is created in the OS image for the block "S7Mot". However, you can select from a number of block icons. These are stored in the OS image "@PCS7Typicals_IL_S7".

1. To determine the code number of the desired block icon, open the OS image and display the properties of the corresponding icon. Alternatively, move the mouse pointer over an icon and wait until the ToolTip text appears.



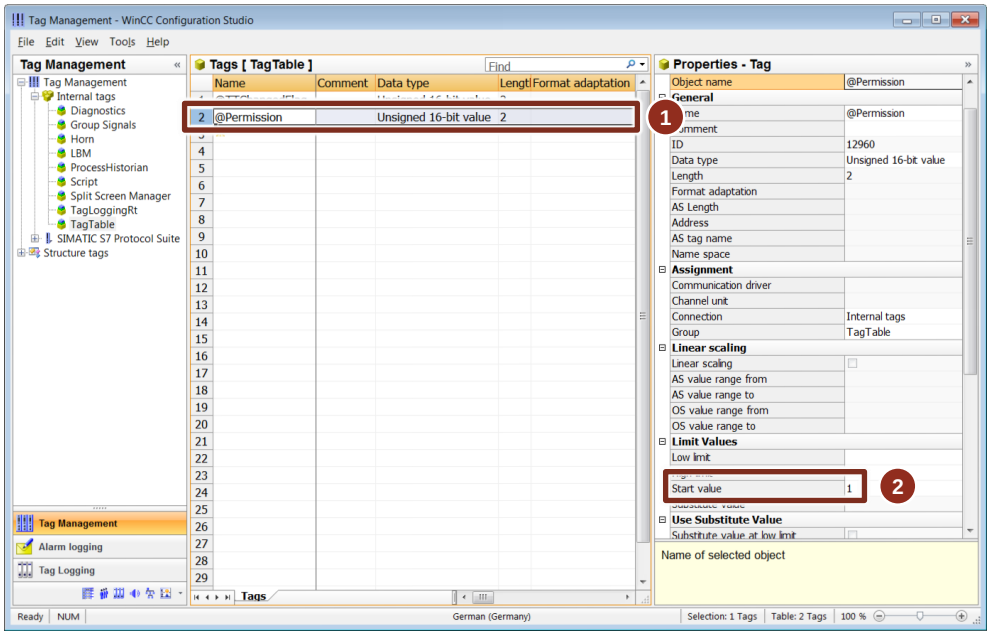
2. If you want to use another block icon, open the properties of the technological block (e.g. "S7Mot") in the CFC plan and enter the code number of the desired icon in the input field under "Create block icon". If you do not make an entry here, the icon "@S7Mot/1" is used.



Set operation level for hierarchical operation

Hierarchical operation means that each OS server is assigned a specific operating level. This is done via the internal tag "@Permission". For this tag, the corresponding level is preset as the start value. If the selected user level matches the value of "@Permission", the corresponding IL blocks can be operated at this OS. For the operator panel, the user level is set at the interface block of the respective operator panel.

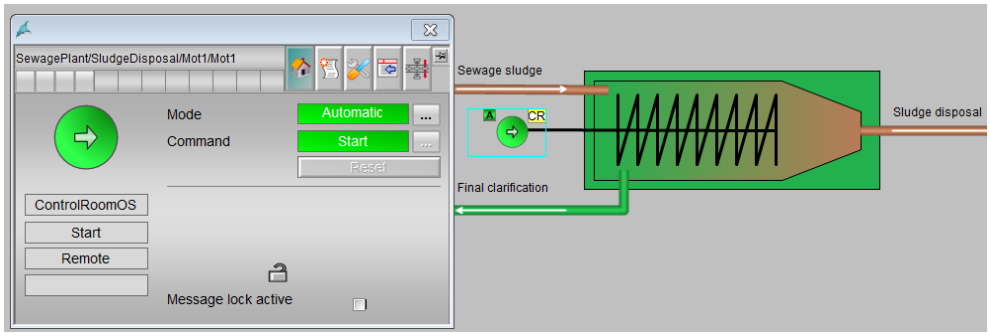
1. Run the function "Compile OS" and open the Open the OS project.
2. Open the Tag Management Editor.



3. Create the internal tag "@Permission" (1) on each OS and assign the value for the corresponding operating level as the start value (2).
4. Perform a time synchronization as described in Chapter 3.2.1 "Synchronization with the SIMATIC method".
5. Open the plant image that contains the generated block. Position the block icon and configure the plant image according to your requirements.

The projected motor could have the appearance shown in the image.

Figure 5-5



6 Configuration and project planning of the operator panel

6.1 Hardware configuration of the AS in the TIA Portal

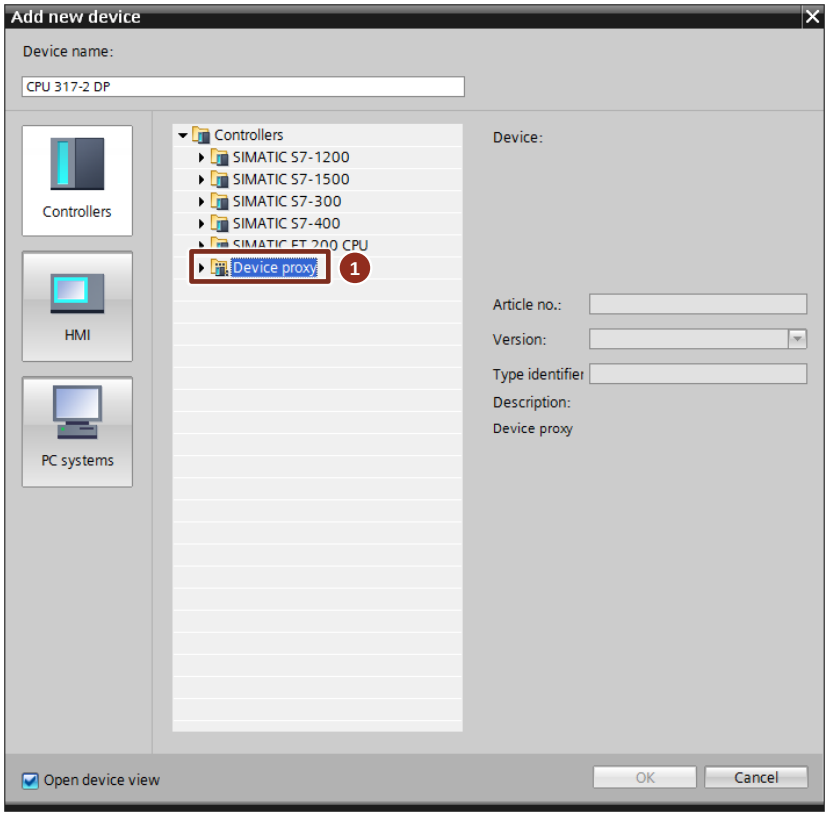
The Comfort Panels are configured using the engineering software "SIMATIC WinCC Comfort (TIA Portal)". In this chapter, you will be guided through the following steps for configuring in the TIA Portal:

- Import the AS data using a device proxy
- Configure the hardware for the Comfort Panel
- Configure the communication connection

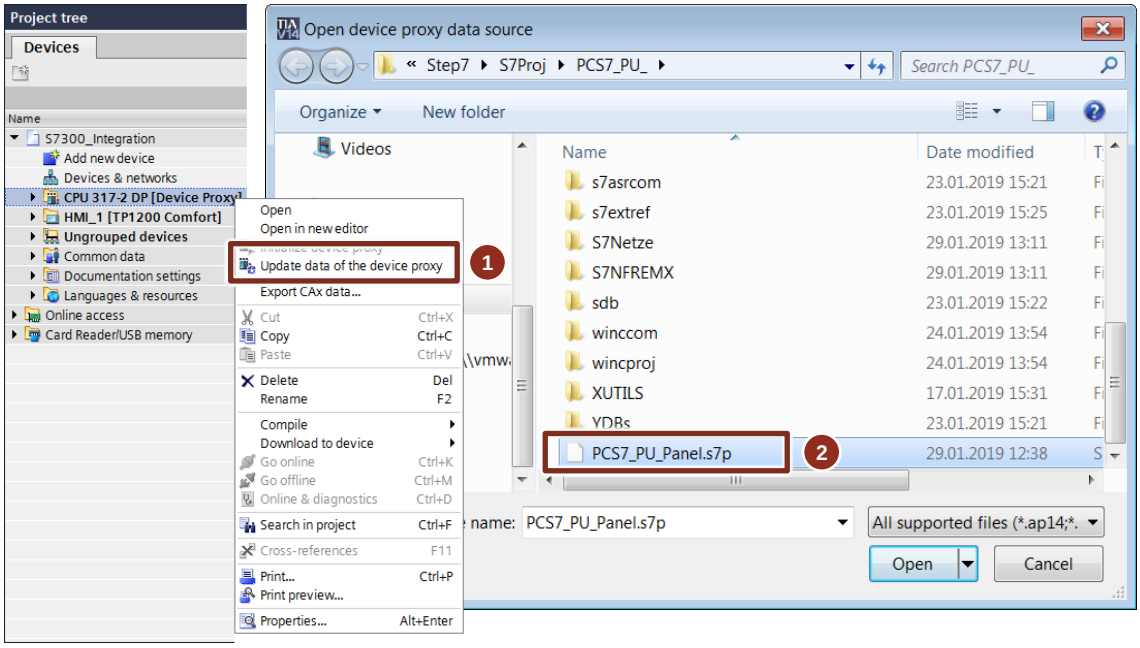
Importing AS data

The AS program has been created with PCS 7. To access the data blocks in the AS with a panel, the AS data is imported using a proxy device in STEP 7 V14 Professional. Follow these steps to configure the controller in the TIA Portal as a device proxy:

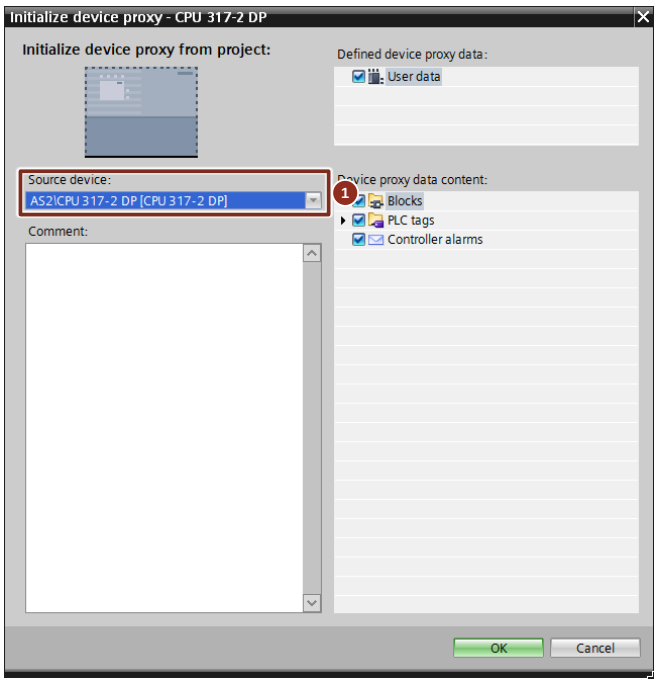
1. Create a new project in the TIA Portal.
2. Insert a new controller in the project. Select "Device Proxy" (1) as the device and assign an appropriate name.



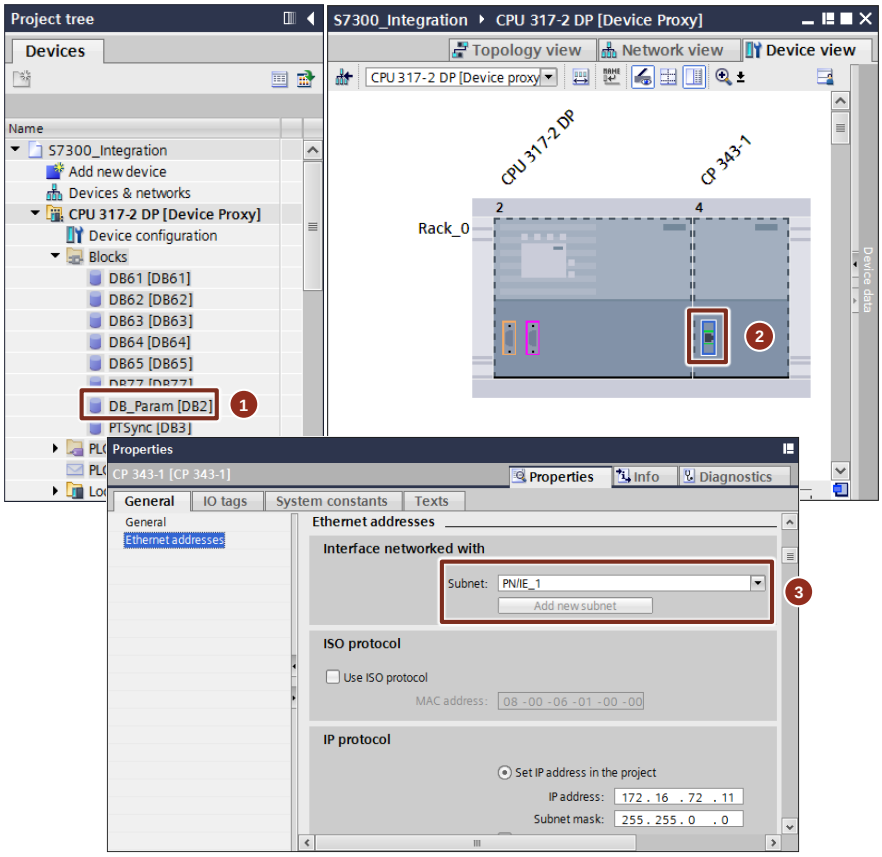
3. In the project view of the TIA Portal, select the command "Initialize device proxy..." from the controller shortcut menu (1).
4. Navigate to the project folder for the PCS 7 project and select the S7 project (2) in which the automation system is configured.



5. If more than one controller is configured in the S7 project, you can select which controller (1) you want to use to import the data.



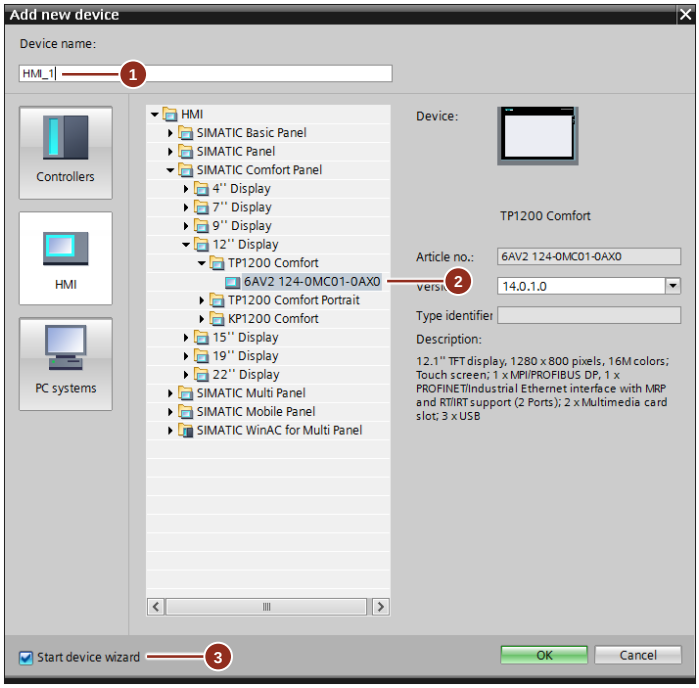
6. Following successful import, you will be able to find all the data blocks of the PLC, such as the panel DB (1) required for configuring the panel, in the TIA project.
7. Mark the Ethernet interface (2) for the CP and select an available subnet in the properties window or create a new subnet (3).



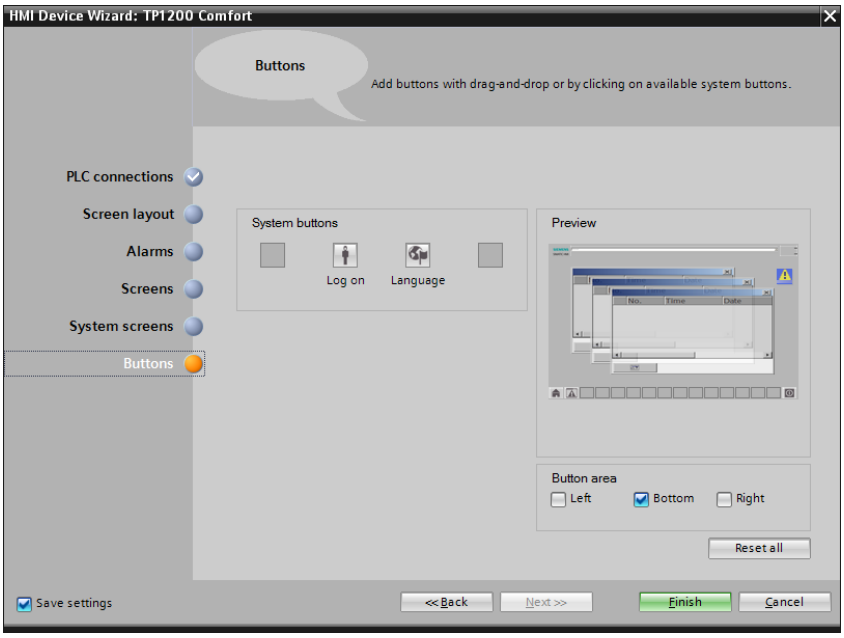
6.2 Hardware configuration of the operator panel in the TIA Portal

Follow these steps to add a panel to the project:

1. Select "Add new device" from the project navigation.
2. Assign a device name (1) and select the Multi-Panel or Comfort Panel to be configured (2). In this example a Comfort Panel TP1200 was used.
   If you have selected the option "Start device wizard" (3), you can adjust the default settings of the panel.

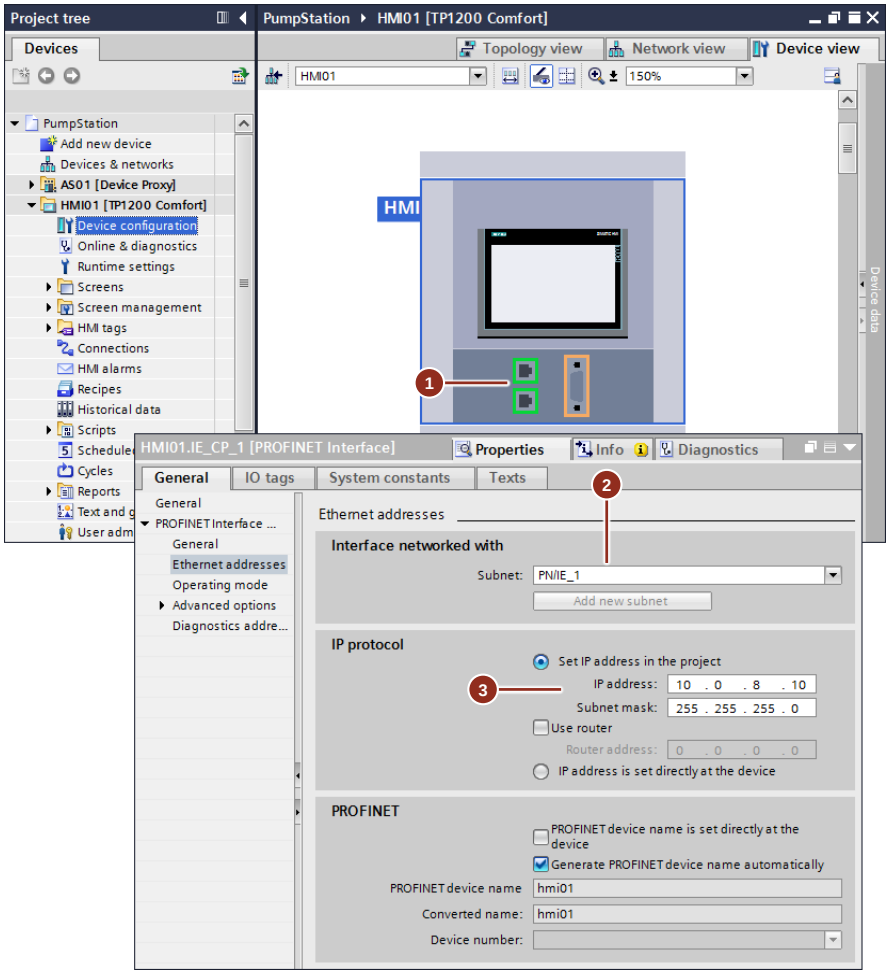


3. Run the device wizard with the default settings. The following settings are possible using the wizard:
   - PLC connections: Configure connections
   - Screen layout: Color, header, logo, etc.
   - Messages: Alarm window, alarm line, system alarms, etc.
   - Pictures: Root screen, create your own screens, etc.
   - System screens: PLC status, project information, system settings, etc.
   - Buttons: System buttons, button areas



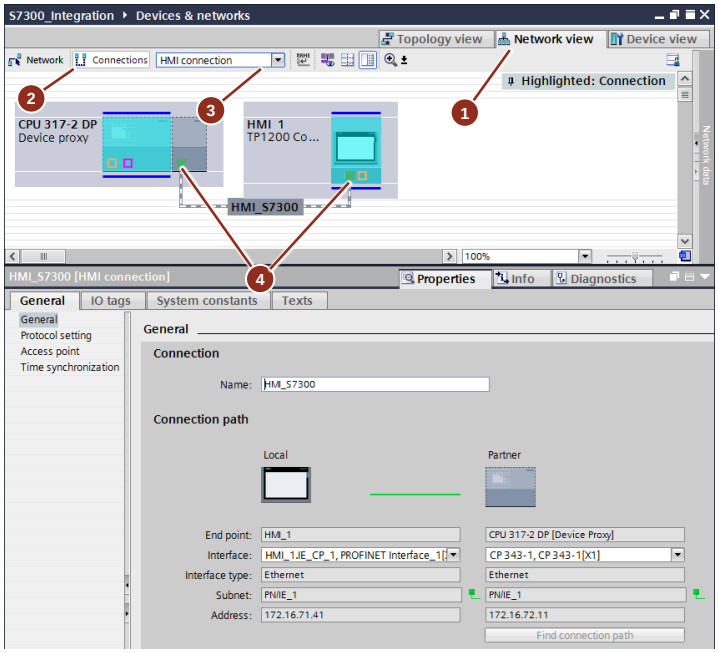
4. After the wizard completes, you will find the Comfort Panel in the project navigator.

5. In the device view, select the Ethernet interface (1) and set the subnet (2) and the IP address (3) for your device.



Configuring HMI connection

1. Switch to the Network view (1) in the device configuration.



2. Select the option "Connections" (2) and select "HMI connection" as connection type (3).
3. Using the mouse, draw a line between the two Ethernet interfaces (4).

6.3 Time synchronization of the operator panel

The time synchronization can be found in the basics, in Chapter 3.2.3 "Synchronization of the operator panel".

6.4 Configuring the panel project

This chapter will explain how to create the panel project:

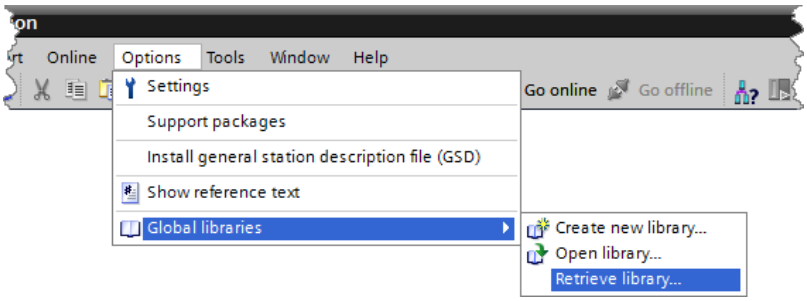
- Setting up the project library
- Configuring the tags
- Configuring the icons and faceplates
- Adjusting the text lists
- Configuring the operating level on the panel

6.4.1 Preparing the project library

Retrieving the library

After the "SIMATIC Industry Library WinCC Comfort" package has been installed using the general setup of IL V9.0 Upd1, you will still have to retrieve the installed WinCC Comfort V14 library. The default location for the "IL_S7_V14.zal14" library file is in the
"C:\Program Files (x86)\SIEMENS\Industry Library" folder.

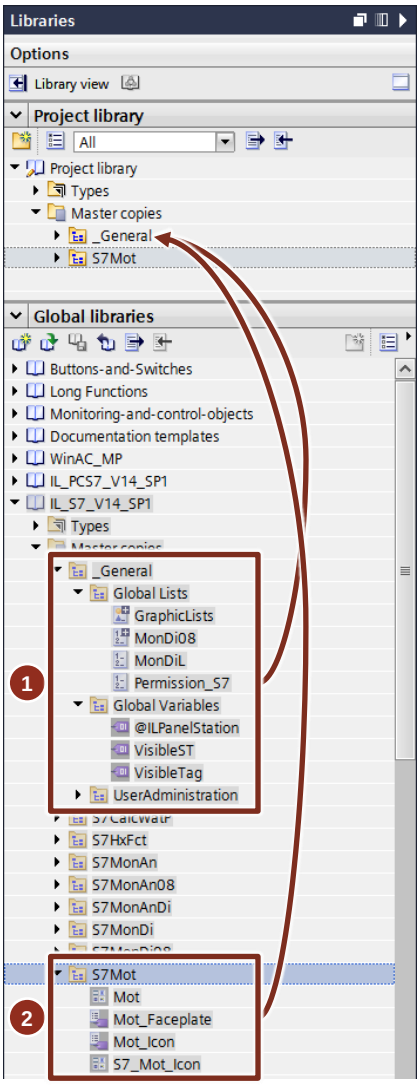
1. In the TIA portal, select the menu command "Extras > Global libraries > Retrieve library…" to retrieve the library.



Setting up the project library

Before you make a start on configuration, copy all the necessary functions from the "IL_S7_V14" library into the project library. As a prerequisite for this, you must have completed the installation of the IL for the TIA Portal and have retrieved the "IL_S7_V14" library. Proceed as follows:

1. Using drag-and-drop, move the "_General" folder into the "Master copies" folder in the project library (1). The objects in the "_General" folder are always necessary.
2. Drag-and-drop all the necessary functions (2) from the IL library into the "Master copies" folder in the project library.



6.4.2 Configuring block icons and faceplates

Each block container of the IL library contains all the necessary objects for the respective technological function (e.g. motor, valve, etc.). These are:

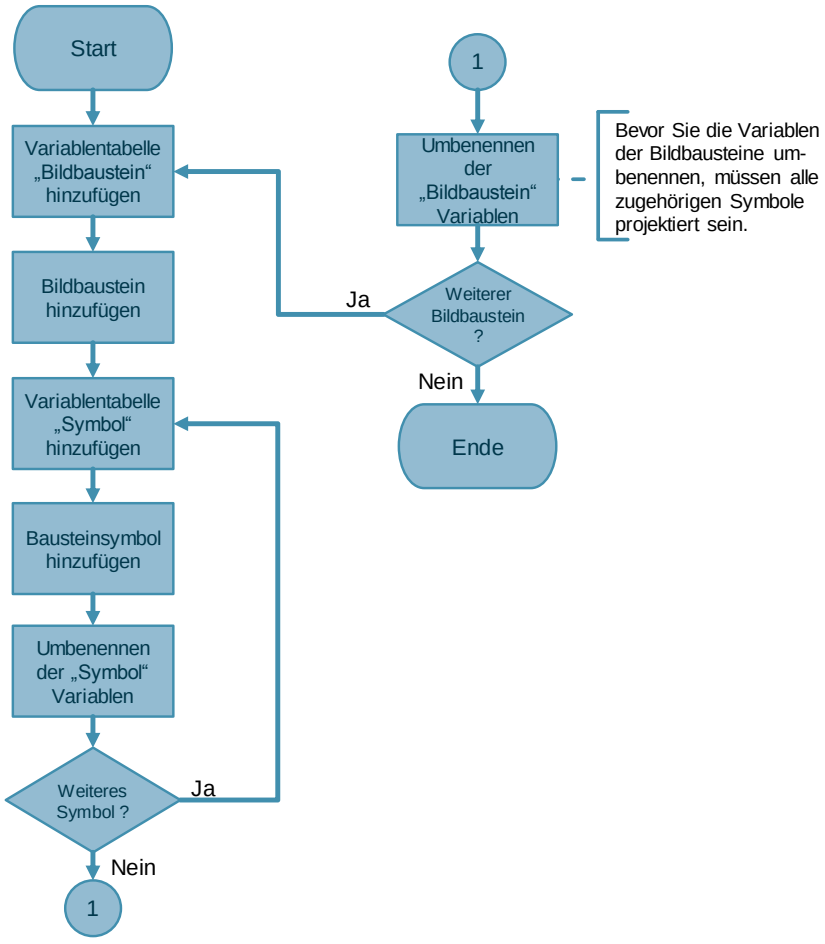
- Block icon for the technological function
- Faceplate for the technological function
- Tag table for the icon
- Tag table for the faceplate

In order to connect the icons and faceplates to the process, you need the tags contained in the tag table. Each configured icon and each faceplate needs its own associated tag table. However, several block icons of the same type can use the same faceplate with just one tag table to display the process data.

If several icons use the same faceplate, it is necessary to observe the sequence, as shown in the following display, during configuration.

This is important in order to keep the configuration effort to a minimum. If the sequence is not followed, it can result in the image objects being connected with the wrong tags, and these assignments then need to be corrected manually.

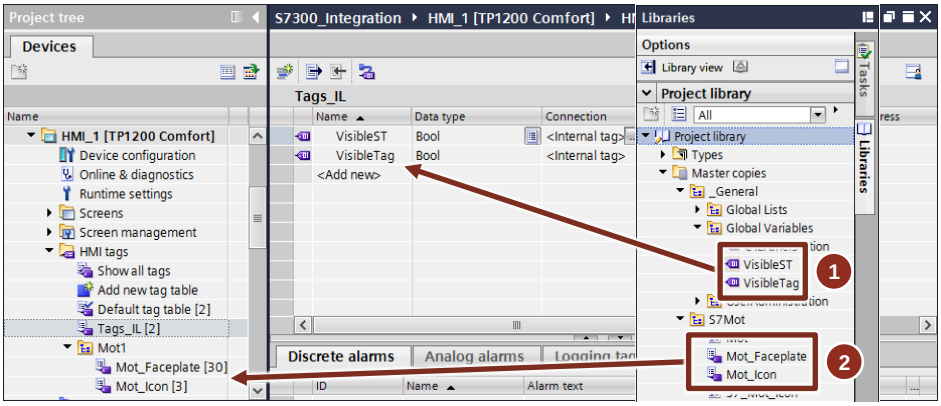
Figure 6-1



Configuring tags

Each panel project that is to be configured using the IL blocks, needs one copy of the internal tags "VisibleST" and "VisibleTag" in order to display the faceplates.

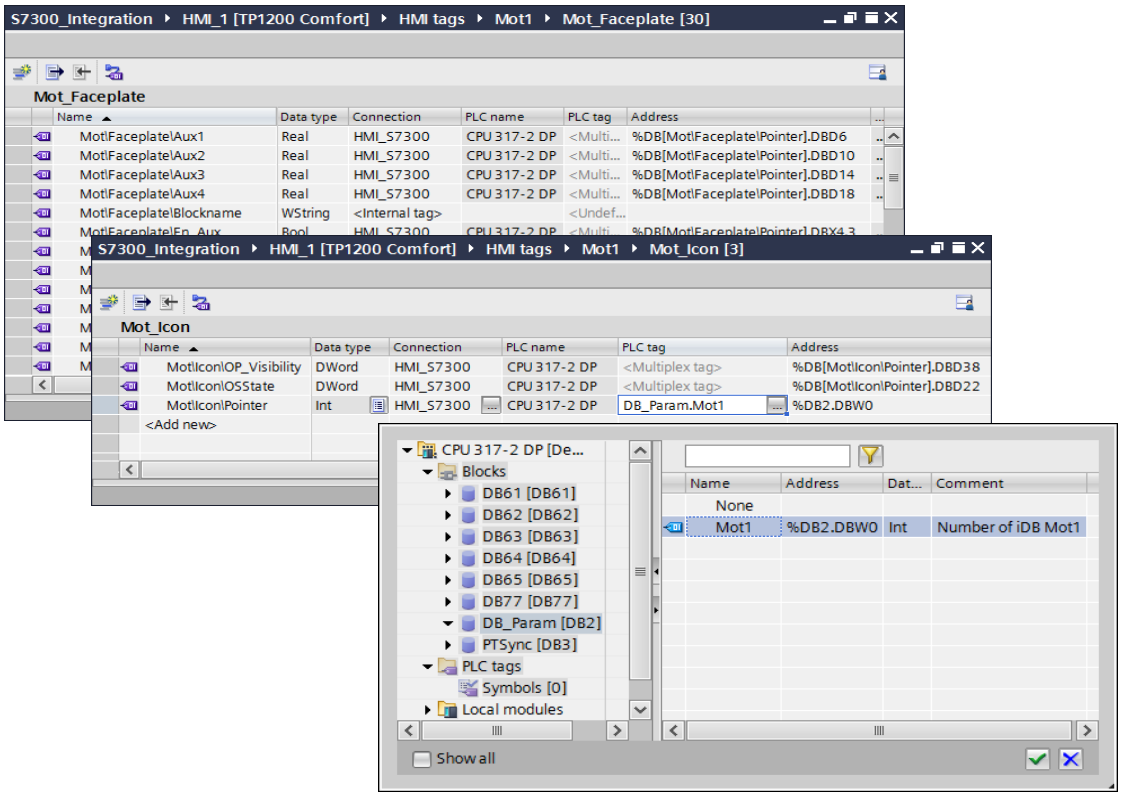
1. Copy the tags "VisibleST" and "VisibleTag" (1) from the project library (Master copies > General > Global Tags) into the panel project.



2. Copy the tag tables "Mot_Faceplate" and "Mot_Icon" (2) from the project library to the project folder "HMI tags".

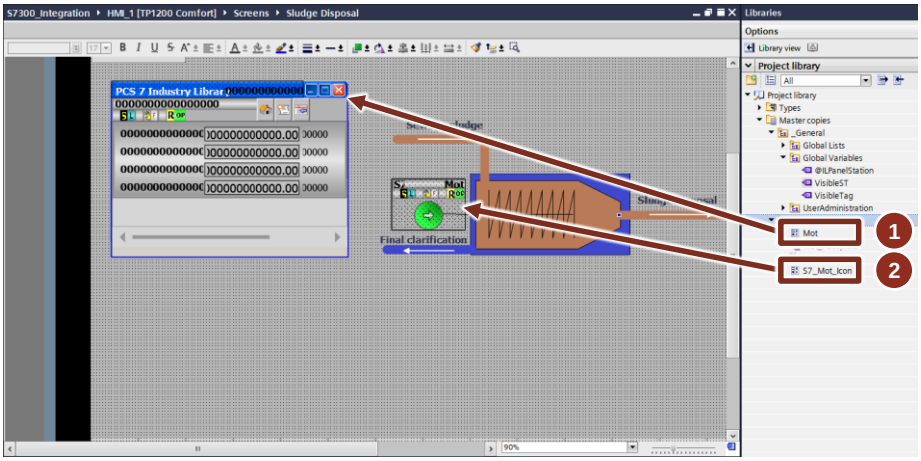
3. Open the newly created tag tables.
4. Select the HMI connection to the AS required for the process tags. As in Excel, you can use the handle to drag the selected connection and copy it to the remaining tags.
5. Set the address of the tag "*\Pointer" in the tag table "Mot_Icon" to the parameter in the DB_Param intended for this block.

Figure 6-2



Creating process images

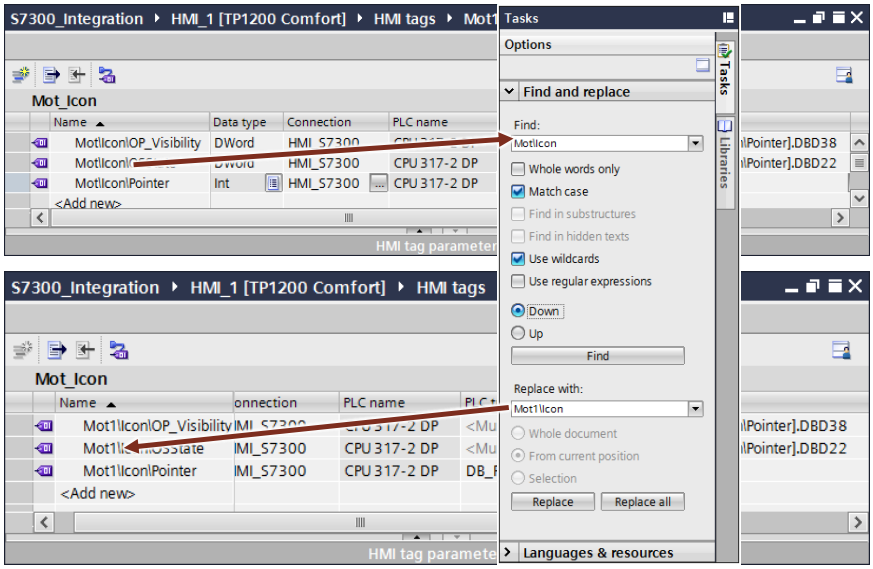
1. Open a new or existing process screen, e.g. the root screen created using the wizard and defined as the start screen.
2. Drag the blocks "Mot" (1) and "PCS7_MotL_Icon" (2) into the process screen. The previously created tags will be automatically linked to these image objects.



3. In order to add further block icons of the same type, you must first change the prefix of the tag name for the icons. You can do this using the "Find and replace" function. Change the name of the associated tag table too.

You can now add additional block icons and faceplates with the associated tag table, but make sure to always follow the editing sequence.

Figure 6-3



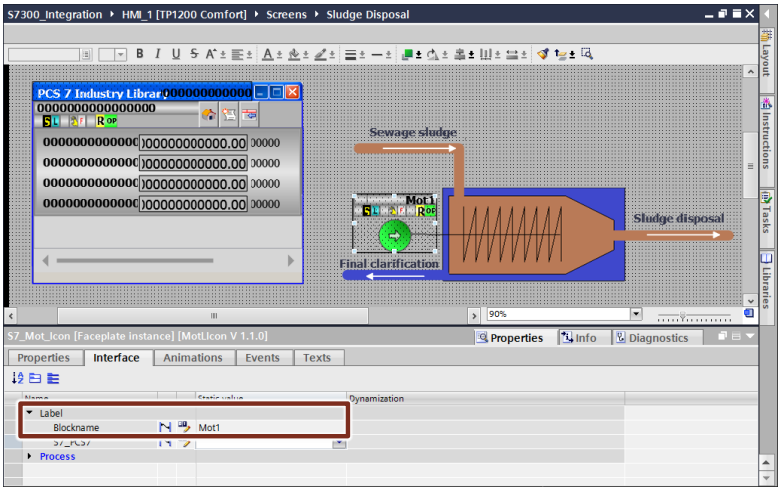
NOTICE	**It is possible to make unintended changes to tags** The "Find and replace" function makes it easy to alter the tag names throughout the project. Make sure that you always include a static component in the Find box, which you must also enter in the Replace box.

6.4.3 Adjusting the texts for the block icons

In order to identify the configured blocks at execution time, it is necessary to make adjustments to some properties of the block icon. The texts for the icon are static. The dynamic texts on the faceplate are written into the corresponding tags at the icon by means of an event.

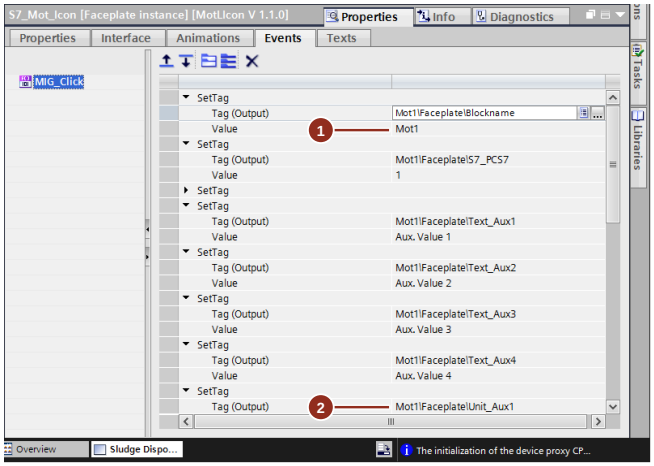
Taking the MotLIcon block as an example, this section will demonstrate how to adjust the names of process tags and the entity. Proceed as follows:

1. Select the block icon and switch to the "Interface" tab in the Properties window.
2. Change the value at "Label > Blockname" to the name of the process tag to which the icon is connected.



To also display the texts on the faceplate, click on the icon to write the values in the faceplate tags.

3. Switch to the "Events" tab.



4. For the tag "Blockname" (1), change the text to the name of the process tag to which the icon is connected.
5. If additional external process values are configured on the panel block in the S7 program, you can adjust the units of these process values for the tags "Unit_Aux1" to "Unit_Aux4" (2).

6.4.4 Adjusting the texts for the input levels

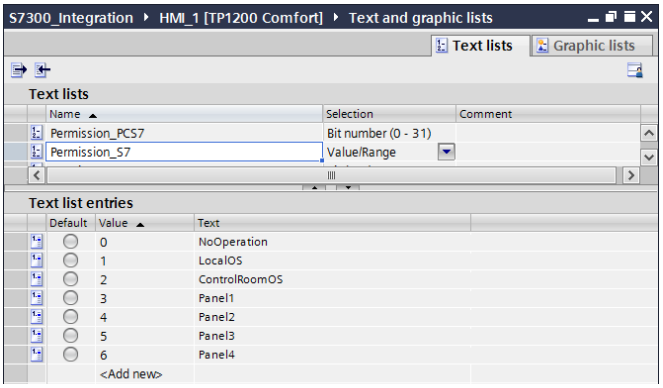
The faceplates of the "IL for WinCC Comfort" are linked with text lists which are generated by insertion into a panel display. The text lists are used to display the currently selected input levels on the faceplate.

The text lists are already configured with standard texts. If you have chosen different names for the input levels in the enumerations of the PCS 7 project, you will need to adjust the text lists in the panel project likewise.

The text fields inserted in the faceplates for the selected input level are connected to the "Permission_PCS7" text list. If you insert additional faceplates into a process screen after the change to the text list, a further text list which is assigned to the new block will be created.

Proceed as follows:

1. Open the editor for text and graphics lists from the project navigation.
2. Select the text list "Permission_PCS7".

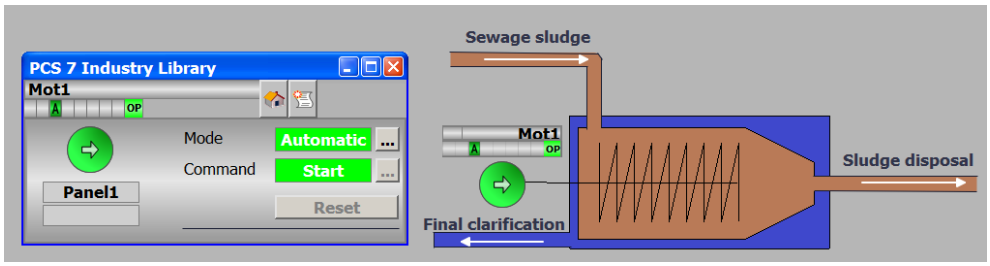


3. Adjust the texts to match the configuration of the enumeration "OP_Conf1" in the SIMATIC Manager.
4. Compile and download the operator panel.

6.4.5 Runtime

You have now finished configuring the technological functions for the Comfort Panel. If an operator authorization exists, the motor can be operated via the operator panel. The currently authorized operating level can be seen in the faceplate.

Figure 6-4



7 Alternative configurations

7.1 Granting operating authorization on the panel

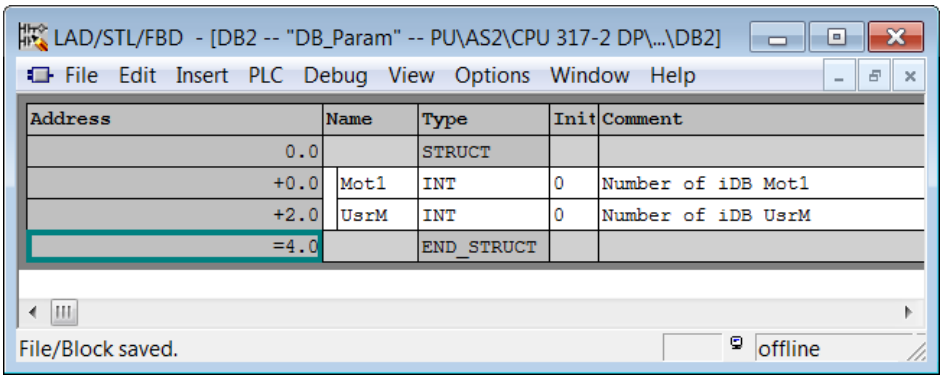
As an alternative to the principle for distributing operating authorizations shown in the chapter 3.3 Hierarchical operation concept "Hierarchical operation", the Industry Library V8.2 has also made it possible to control operating authorizations via a panel.

Note It is recommended, however, to only allow operating authorizations from one location at a time in order to avoid inconsistencies during operation. This means that the operator authorizations should be controlled either only from a panel or only from the OS.

The configuration of the operator control via the panel is similar to that of a motor in chapter "Configuration and project planning of the package unit". For the control of the operating authorization via the panel, the block "S7UsrM" is connected with the equivalent block "PUsrM" for the panel. The WinCC Comfort V14 library ("IL for WinCC Comfort") provides corresponding faceplates and icons for operation on the panel.

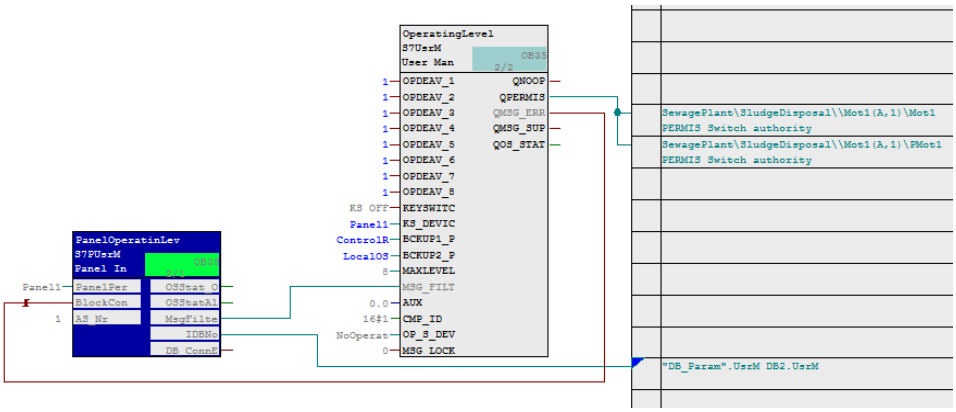
7.1.1 Configuration von "PUsrM" in the S7 program

1. Create a new data block or open an existing one using the panel IDB numbers in the S7 program. For example, use the DB number "DB25". This number is already preconfigured in the case of the panel blocks in the TIA Portal. This means you then need to make fewer adjustments during the panel configuration.
2. For each new interface block, create a parameter of type "INT" in the data block.



3. Open the already configured CFC chart with the block "S7UsrM" .

4. Add the block S7PUsrM from the IL for S7 library.
5. Connect the outputs and inputs as shown in the following figure.



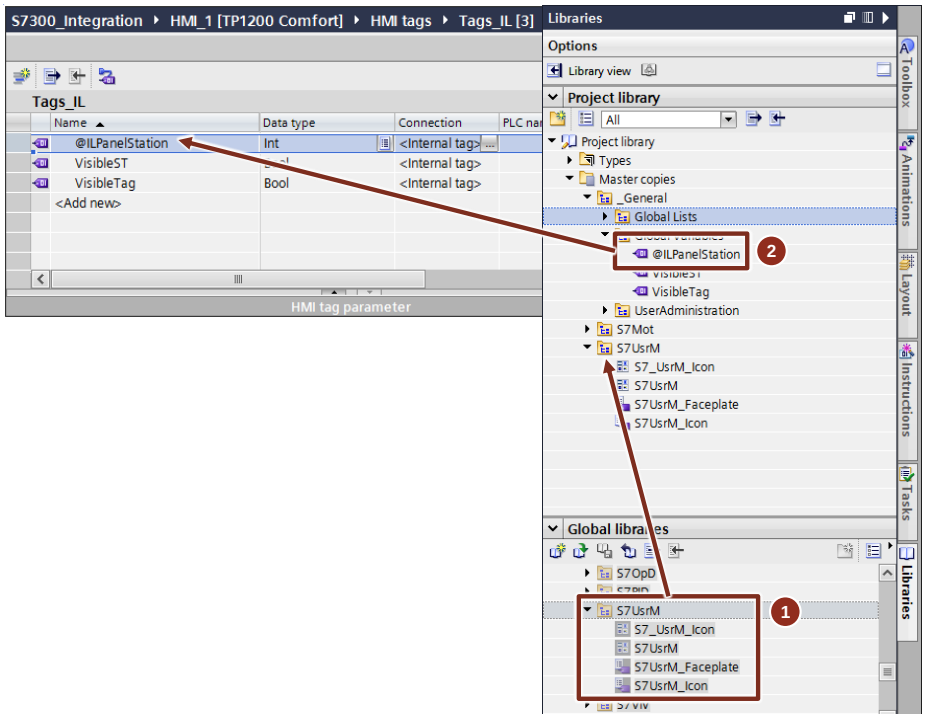
6. Compile and download the S7 program.

7.1.2 Configuration der panel operator authorization in the TIA portal

The configuration of the panel authorization in the TIA portal is similar to the configuration of a motor, as described in the chapter "Configuring the panel project".

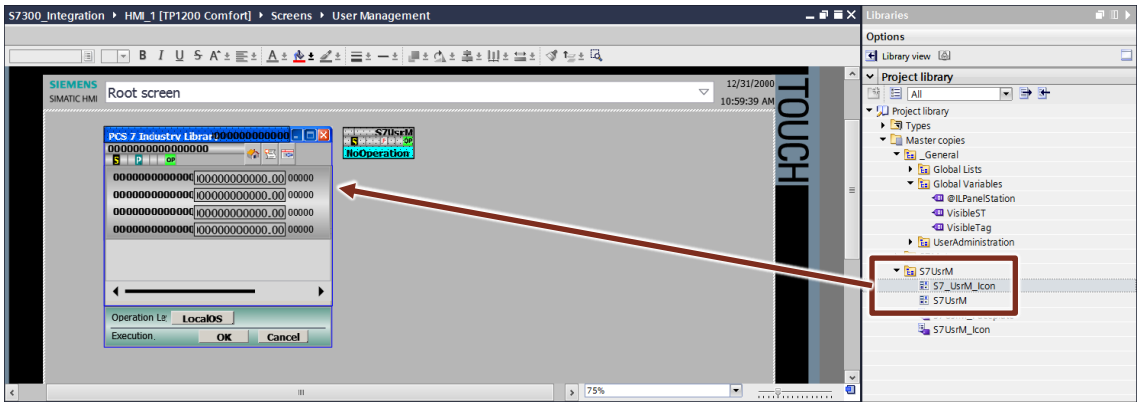
However, the panel project requires the internal tag "@ILPanelStation" in addition to the two internal tags "VisibleST" and "VisibleTag" for the operation of the user authorization.

1. Copy the folder S7UsrM from the Global Library "IL_S7_V14_SP1" ("Master copies > S7UsrM") into your project library.
2. Copy the tag "@ILPanelStation" (1) from the project library (Master copies > _General > Global Variables) into the panel project. You can use the default tag table for the project, which has already been created, as the target.

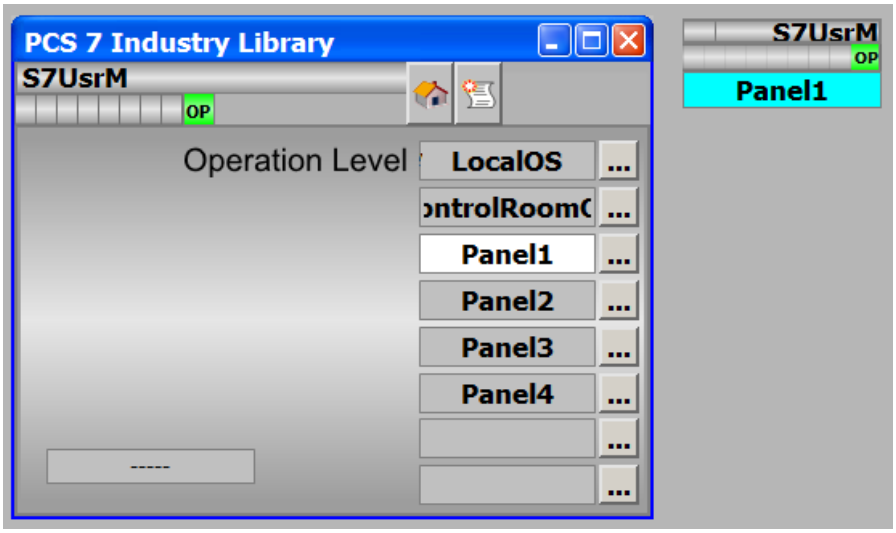


3. Copy the tag tables "S7UsrM_Faceplate" and "S7UsrM_Icon" (2) from the project library into the project folder "HMI tags".
4. Open the newly created tag tables.
5. Select the HMI connection to the AS required for the process tags. As in Excel, you can use the handle to drag the selected connection and copy it to the remaining tags.
6. Set the address of the tag "*\Pointer" in the tag table "UsrM_Icon" to the parameter provided for this block in the panel DB.
7. Open a new or existing process image project.

8. Drag the blocks "UsrM" and "PCS7_UsrM_Icon" into the process image. The previously created tags will be automatically linked to these image objects.



9. Adjust the operating levels as described in Chapter 6.4.4 "Adjusting the texts for the input levels".
10. Compile and download the panel.
11. The operator authorizations can now be controlled via the panel.



8 Appendix

8.1 Service and support

Industry Online Support

Do you have any questions or need assistance?

Siemens Industry Online Support offers round the clock access to our entire service and support know-how and portfolio.

The Industry Online Support is the central address for information about our products, solutions and services.

Product information, manuals, downloads, FAQs, application examples and videos – all information is accessible with just a few mouse clicks:
support.industry.siemens.com

Technical Support

The Technical Support of Siemens Industry provides you fast and competent support regarding all technical queries with numerous tailor-made offers – ranging from basic support to individual support contracts. Please send queries to Technical Support via Web form:
www.siemens.com/industry/supportrequest

SITRAIN – Training for Industry

We support you with our globally available training courses for industry with practical experience, innovative learning methods and a concept that's tailored to the customer's specific needs.

For more information on our offered trainings and courses, as well as their locations and dates, refer to our web page:
www.siemens.com/sitrain

Service offer

Our range of services includes the following:

- Plant data services
- Spare parts services
- Repair services
- On-site and maintenance services
- Retrofitting and modernization services
- Service programs and contracts

You can find detailed information on our range of services in the service catalog web page:
support.industry.siemens.com/cs/sc

Industry Online Support app

You will receive optimum support wherever you are with the "Siemens Industry Online Support" app. The app is available for Apple iOS, Android and Windows Phone:
support.industry.siemens.com/cs/ww/en/sc/2067

8.2 Links and Literature

Table 8-1

No.	Topic
\1\	Siemens Industry Online Support https://support.industry.siemens.com
\2\	Link to the article page of the application example https://support.industry.siemens.com/cs/ww/en/view/50708061
\3\	Sales/delivery release SIMATIC PCS 7 Industry Library V9.0 https://support.industry.siemens.com/cs/ww/en/view/109750720
\4\	Integration of third-party systems with SIMATIC PCS 7/OPEN OS http://support.automation.siemens.com/WW/view/en/49740087
\5\	Manual "PCS7 OS Process Control" https://support.industry.siemens.com/cs/ww/en/view/109754981
\6\	Determining the status of the H system http://support.automation.siemens.com/WW/view/en/19537149

8.3 Change documentation

Table 8-2

Version	Date	Modifications
V1.0	07/2011	Publication (Intranet)
V2.0	06/2012	Changed to IL, Publication (Internet)
V3.0	02/2019	Complete revision: Updating to PCS V9.0 SP1 IL V9.0 Upd1, TIA Portal V14 SP1 Upd6 Panel TP1200 Comfort