

Industry Online Support

NEWS

Integration of Operator Panels in SIMATIC PCS 7 via the Industry Library

SIMATIC PCS 7 V9.0/ Industry Library V9.0 / TIA Portal V14

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

Siemens Industry Online Support



Legal information

Use of application examples

Application examples illustrate the solution of automation tasks through an interaction of several components in the form of text, graphics and/or software modules. The application examples are a free service by Siemens AG and/or a subsidiary of Siemens AG ("Siemens"). They are non-binding and make no claim to completeness or functionality regarding configuration and equipment. The application examples merely offer help with typical tasks; they do not constitute customer-specific solutions. You yourself are responsible for the proper and safe operation of the products in accordance with applicable regulations and must also check the function of the respective application example and customize it for your system.

Siemens grants you the non-exclusive, non-sublicensable and non-transferable right to have the application examples used by technically trained personnel. Any change to the application examples is your responsibility. Sharing the application examples with third parties or copying the application examples or excerpts thereof is permitted only in combination with your own products. The application examples are not required to undergo the customary tests and quality inspections of a chargeable product; they may have functional and performance defects as well as errors. It is your responsibility to use them in such a manner that any malfunctions that may occur do not result in property damage or injury to persons.

Disclaimer of liability

Siemens shall not assume any liability, for any legal reason whatsoever, including, without limitation, liability for the usability, availability, completeness and freedom from defects of the application examples as well as for related information, configuration and performance data and any damage caused thereby. This shall not apply in cases of mandatory liability, for example under the German Product Liability Act, or in cases of intent, gross negligence, or culpable loss of life, bodily injury or damage to health, non-compliance with a guarantee, fraudulent non-disclosure of a defect, or culpable breach of material contractual obligations. Claims for damages arising from a breach of material contractual obligations shall however be limited to the foreseeable damage typical of the type of agreement, unless liability arises from intent or gross negligence or is based on loss of life, bodily injury or damage to health. The foregoing provisions do not imply any change in the burden of proof to your detriment. You shall indemnify Siemens against existing or future claims of third parties in this connection except where Siemens is mandatorily liable.

By using the application examples you acknowledge that Siemens cannot be held liable for any damage beyond the liability provisions described.

Other information

Siemens reserves the right to make changes to the application examples at any time without notice. In case of discrepancies between the suggestions in the application examples and other Siemens publications such as catalogs, the content of the other documentation shall have precedence.

The Siemens terms of use (https://support.industry.siemens.com) shall also apply.

Security information

Siemens provides products and solutions with Industrial Security functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens' products and solutions constitute one element of such a concept.

Customers are responsible for preventing unauthorized access to their plants, systems, machines and networks. Such systems, machines and components should only be connected to an enterprise network or the Internet if and to the extent such a connection is necessary and only when appropriate security measures (e.g. firewalls and/or network segmentation) are in place. For additional information on industrial security measures that may be implemented, please visit **Fehler! Linkreferenz ungültig.**

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends that product updates are applied as soon as they are available and that the latest product versions are used. Use of product versions that are no longer supported, and failure to apply the latest updates may increase customer's exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed at: <u>https://www.siemens.com/industrialsecurity</u>.

Table of contents

Lega	Legal information2			
1	Introdu	ction	5	
	1.1 1.2 1.2.1 1.2.2 1.3 1.3.1 1.3.2 1.3.3	The task Solution Overview Hardware and software components Basics SIMATIC PCS 7 Industry Library V9.0 Time synchronization Hierarchical operating concept.	5 6 7 8 9 9 11 12	
	1.3.4	Operator authorization and user configuration	13	
	1.3.5	Process fault diagnostics	14	
2	Configu	uration and project planning	16	
	2.1 2.1.1 2.1.2 2.1.3 2.2 2.2.1	Configuring the control program. Creating/extending a panel data block Configuring the APL block Configuring the panel block of the Industry Library Configuring the multiple control roomoperation in the control program Configuring the names of the input levels	16 16 16 17 18 18	
	2.2.2 2.2.3 2.2.4 2.3 2.4 2.4.1 2.4.2 2.5 2.5.1	Configuring the "UsrM" block Connecting the "UsrM" block Setting the input level for the interface blocks for panels Compiling and loading the S7 program Configuring the OS Creation of the operating image Defining the input level for the OS Hardware configuration in the TIA Portal Importing AS data	19 20 21 22 22 22 23 24 24	
	2.5.2 2.5.3 2.6 2.6.1 2.6.2 2.6.3 2.6.4 2.6.5 2.6.6 2.6.7 2.6.8 2.6.9 2.6.10	Configuring the panel Configuring HMI connection Configuring the panel project Retrieving the library Setting up the project library Configuring block icons and faceplates Adjusting the texts for the block icons Adjusting the texts for the block icons Adjusting the texts for the input levels Creating graphics Assigning alarm window parameters Critical messages caused by multiplex tags User-configurable message classes Loading the panel	27 30 31 32 33 39 41 42 44 45 46 49	
3	Panel c	onnection to an H-CPU	51	
	3.1 3.2 3.3 3.4 3.5	How do you read out the operating state and status of an H system? Configuring hardware in the TIA portal Configuring connections in WinCC Comfort Configuring monitoring tags Configuring the technological blocks	51 52 52 53 55	
4	Time sy	/nchronization	57	
	4.1 4.1.1	Time synchronization of AS and OS Synchronization using the SIMATIC process	57 57	

	4.1.2 4.2 4.3	Synchronization in the NTP process Time synchronization panel Time synchronization with an H-system	59 60 62
5	Alternat	ive configurations	63
	5.1 5.1.1 5.1.2	Assigning operator authorization on the panel Configuration of "PUsrM" in the S7 program Configuration of the panel operator authorization in the TIA	63 63
_		Portal	65
6	Operation	on at execution time	68
	6.1 6.2	Setting the authorized input level during runtime Operation on the OS and on the Operator Panel	68 70
7	Append	ix	71
	7 1	Service and curport	71

1 Introduction

1.1 The task

Introduction

In modern production plants, engineering processes are generally monitored and controlled from the control room. There is also a requirement for in-process operation and monitoring of system sections.

Different alarm systems, operating philosophies, and different configuration software must be taken into account when integrating operator panels into the higher level process control system.

Description of the automation task

The system engineer will be shown how to integrate operator panels into a PCS 7 project in order to operate and visualize PCS 7 system sections. Configuration should match the PCS 7 standard as closely as possible.

Figure 1-1



1.2 Solution

Using the SIMATIC PCS 7 Industry Library

The components of the SIMATIC PCS 7 Industry Library provide the basis for using Comfort Panels. The "IL for PCS 7" library includes interface blocks for this purpose, which interact with the blocks of the PCS 7 APL (Advanced Process Library) and provide the necessary data for representation on the Comfort Panel.

A WinCC Comfort V14 library ("IL for WinCC Comfort") is supplied in addition to the interface blocks; this contains preconfigured block icons and faceplates for display on the Comfort Panel.

Advantages of the solution using SIMATIC 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
- Number of functions created by the user is reduced. This leads to a cost saving over the entire life cycle
- Synergy effects related to training and knowledge transfer

Delimitation

The following topics are not covered in this document:

- Connection of S7-200, S7-1200, S7-1500
- Integration of third-party controls The following article already includes one way of achieving this automation task: <u>http://support.automation.siemens.com/WW/view/en/49740087</u>
- 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.
 <u>http://support.automation.siemens.com/WW/view/en/19951154</u>
- 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 WinCC Comfort V14 (TIA Portal) are required.

Alternatives

Instead of Industry Library, you could also use custom-made programmed interface blocks. However, this solution entails additional effort in creating the control program and configuring the Comfort Panel.

The PCS 7 OS Web option represents a further means of operating the PCS 7 system from the operator panel. Here, the panel operates as a PCS 7 Web client, launched in Internet Explorer. This solution requires additional licenses for the PCS 7 OS Web option. You also have the option of using complete Panel PCs instead of operator panels. Once the OS client software is installed, these panel PCs can be used as complete PCS 7 OS clients. It is then unnecessary to adapt the control program, but in addition to the expensive hardware you will need additional licenses for the OS client software.

1.2.1 Overview

The "IL for PCS 7" interface blocks are integrated into the PCS 7 project and connected with the technological blocks of the PCS 7 APL. The Comfort Panels are configured in WinCC Comfort V14 (TIA) by means of "IL for WinCC Comfort".



Figure 1-2

Core functionality

The block library "IL for PCS 7" includes a suitable interface block for some of the technological blocks of the APL (e.g., motor, valve, analog value monitoring, etc.). The role of the interface blocks is to evaluate the status signals of the APL blocks and provide these to the Comfort Panel. Furthermore, the IL blocks should be connected to the APL blocks in such a way that they issue the switching commands for the APL block. This switches the technological block to "Local" operating mode.



1.2.2 Hardware and software components

The following hardware and software components were used to create this application example:

Hardware components

Components	Quantity	Article number	Note
CPU 417-4H	2	6ES7 417-4HT14-0AB0	Redundant for Section " <u>3. Panel</u> <u>connection to an H-</u> <u>CPU</u> "
CP 443-1	2	6GK7 443-1EX30-0XE0	Redundant for Section " <u>3. Panel</u> <u>connection to an H-</u> <u>CPU</u> "
MP 377	1	6AV6 644-0AA01-2AX0	-
TP 1200	1	6AV2 124-0MC01-0AX0	-

Software components

Table 1-2

Components	Article number	Note
PCS V9.0 SP1	6ES7 658-5AX58-0YA5	-
WinCC Comfort V14 SP1 Upd 6	6AV2 101-0AA04-0AA5	-
PCS 7 Industry Library V9.0 Upd1	6DL5 410-8AX58-0YA0	-

 Note
 Compatibility:

 • To avoid problems with the "Device Proxy Import" in Section 2.5.1, WinCC Comfort (TIA portal) must be installed together with PCS 7 on a PC.

 • SIMATIC PCS 7 V9.0 SP1 is only compatible with WinCC Comfort V14 SP1 if Update 4 or Update 6 for WinCC Comfort V14 SP1 is installed.

 • The PCS 7 Industry Library V9.0 is only compatible with WinCC Comfort V14 SP1 in combination with Update 1.

 • The older multipanels (MP series) can no longer be configured from TIA Portal V15.

1.3 Basics

1.3.1 SIMATIC PCS 7 Industry Library V9.0

The "IL for PCS 7" block library used in this application example includes interface blocks which interact with the blocks of the PCS 7 APL (Advanced Process Library) and provide the necessary data for operation, monitoring and reporting on the Comfort Panel.

WinCC V14 conforming block icons and faceplates ("IL for WinCC Comfort") are supplied in addition to the interface blocks; these are used for configuration on the operator panel.

In order to avoid inconsistencies resulting from operation at different stations, the Industry Library contains blocks to enable multiple control room operation.

The following libraries are used for integrating Comfort Panels into the PCS 7 environment:

Library	Description		
PCS 7 APL V9.0	The function blocks of the APL model the processing apparatus, such as valves or motors, in the controller. They form the software-based starting point for controlling your system.		
IL for PCS 7	The Industry Library includes interface blocks for operation and monitoring of the process with the help of panels. The interface blocks interact with the technological functions of the APL.		
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.		

Table 1-3





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
- Reduction in the time and costs for development
- The best setup for upgrading to newer PCS 7 versions

System requirements for using PCS 7 Industry Library

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

Table 1-4

Library	Configuration software		
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		
	SIMATIC PCS 7 V9.0 SP1 with installed Industry Library V9.0		
IL for PCS 7	SIMATIC PCS 7 V9.0 SP1		
	SIMATIC PCS 7 APL V9.0		
IL for WinCC Comfort	SIMATIC Step7 Professional V14 SP1 Upd4		

The following hardware is considered to be the minimum requirement:

Table 1-5

Library	Hardware		
IL for S7	S7-315 PN/DP and from Firmware V3.1		
IL for PCS 7	The system requirements for Advanced Process Library V9.0 apply		
IL for WinCC Comfort	Comfort / Multi Panels (display size ≥ 12 inch)		

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

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

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 they 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

1.3.2 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.

You can find detailed information on time synchronization in the following manual: <u>https://support.industry.siemens.com/cs/ww/en/view/109754988</u>

Integrating Comfort Panels

The Comfort Panels should also be synchronized in order to prevent time inconsistencies, e.g. when using the bit message procedure. However, these cannot be synchronized using the SIMATIC or NTP processes.

Area pointers are set up in the project of the panel; these synchronize the system time in the controller with the system time in the panel. The control program has to make the current system time available to the area pointer using the system function "SFC1 - READ_CLK".

You can find further information about time synchronization of operator panels in the article "<u>Clock synchronization between a HMI operator panel and a SIMATIC</u> <u>PLC</u>".

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

1.3.3 Hierarchical operating concept

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.



The "UsrM" 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 PCS 7 library. The interface blocks pass the signal on to the associated APL 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.

An alternative control of the operating direction via the Comfort Panel can be found in <u>Section 5</u>.

Figure 1-7				
ority/OperatingLevel	🖊 Authority/OperatingLe	evel		×
ControlRoom	User Management		🔥 🖭 🐑 🌺	
		Operation Level	ControlRoom	
			LocalOS	
			Panel1	
			Panel2	
			Panel3	
			Panel4	
			Panel5	
			Panel6	

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

Configuration of the multiple control room operation will be explained in the remainder of the documentation.

1.3.4 Operator authorization and user configuration

PCS 7 uses three authorization levels as standard for process operation. These are:

- Level 5: Operator inputs Simple 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 1-8

🙀 User Administrator - WinCC Configuration Studio						
<u>F</u> ile <u>E</u> dit <u>V</u> iew <u>H</u> elp						
User Administrator «	See OPAdmin Find	۹ م	• «			
🖃 📲 User Administrator	Function	Enable	^ D			
🗄 👬 Administrator-Group	1 User administration		2			
Operators	2 Authorization for area	\checkmark	Per			
OPAdmin	3 System change		tie			
	4 Monitoring		- 0			
	5 Process controlling	v	-			
	6 Higher process controlling					
	7 Report system					
	8 Activate remote					
	9 Configure remote					
Tag Management	10 Web Access - monitoring only					
	11 Highest process controlling					
Alarm logging	12 Advanced operation 1					
	13 Advanced operation 2		-			
Ready NUM English (United States) Table: 13 Authorizations 100 % 😑 🕂 🕂						

Further information about user hierarchies in PCS 7 can be found in the manual "PCS 7 OS Process Control".

https://support.industry.siemens.com/cs/ww/en/view/109754981

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.

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

1.3.5 Process fault diagnostics

The interface blocks of the "IL for PCS 7" 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 APL block messages are then suppressed. However, the message-type blocks each reserve a further process object in addition to the APL blocks, and require more system resources. All messages of the APL block should always also exist on the associated interface block.

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 1-6

	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

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

http://support.automation.siemens.com/WW/view/en/44240604

2 Configuration and project planning

2.1 Configuring the control program

The hardware configuration of the S7 program and the project engineering of APL blocks are assumed. A PCS 7 project with already three configured motors is used as an example project below. The technological function is configured in the usual way using the APL blocks.

The configuration steps in the S7 program described below are necessary for the Comfort Panel to operate.

2.1.1 Creating/extending a panel data block

Panels need the instance DB number for the interface block of the

technological function which is to be operated on the panel. For this, there is a static data block in the S7 program

with a separate integer variable for

each configured panel block. The integer variables are described using

the value of the IDB number. Proceed as follows:

- 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.

ŧ	🎼 LAD/STL/FBD - [DB25 "PANELDB" PlantA_AS_Prj\AS01\CPU 410-5H\\DB25]						
Debug View			C Debug View	Options Window	v Help _ & ×		
🗋 🗃 🏪 🛃 🎒 👗 🖻 🛍 🗠 🖙 🕼 📩 🔽 😫 😚 ! ! « »!					∎ 60° !≪ ≫! 🗖 🖪 💦		
I	Address	Name	Туре	Initial value	Comment		
	0.0		STRUCT				
	+0.0	DB_M401	INT	0	Motor M401 IDB-Nr.		
	+2.0	DB_ML401	INT	0	Analog ML401 IDB-Nr.		
	+4.0	DB_MOTOR	INT	0	Motor for demonstration		
	=6.0		END_STRUCT				
Press F1 to get Help.				9 offline	Abs < 5.2 Insert		

Figure 2-1

2.1.2 Configuring the APL block

A few preparations are necessary before you can configure the IL interface blocks for panels with the APL blocks. Proceed as follows:

- 1. Insert the APL block "MotL" in the CFC.
- 2. Open the properties of the block. In the "I/Os" tab, switch the following connections to visible:
 - "MsgLock"
 - "OpSt_In"

- "ErrorNum" or any other output of your choice (except "ENO"), in order to link the block to the "BlockConnector" connection of the panel block.
- 3. Enable the block functions "Local authorization" and "Suppress messages". Set the following feature bits to TRUE:
 - Feature.Bit24 local operator authorization
 - Feature.Bit25 suppress all messages if MsgLock = 1

Figure 2-2

#≜	Name	I/O	Туре	Value	Inte	A	F	F	S.	Т	Comment	Invisibl
86	MsgLock	IN	STRUCT		Aut						Inhibit process message	
87	MsgLock.Value	IN	BOOL			\Box			\Box		Value	
88	MsgLock.ST	IN	BYTE			\Box			$\overline{\Box}$		Signal Status	
171	OpSt_In	IN	DWORD		Aut				\Box		Enabled operator stations	
320	ErrorNum	OUT	INT	-1					\Box		Error Number	
196	Feature.Bit23	IN	BOOL	0	<ca< td=""><td></td><td></td><td></td><td>\Box</td><td></td><td>Reserved</td><td></td></ca<>				\Box		Reserved	
197	Feature.Bit24	IN	BOOL	1	<ca< td=""><td></td><td></td><td></td><td>\Box</td><td></td><td>1 = Local authorization active</td><td></td></ca<>				\Box		1 = Local authorization active	
198	Feature.Bit25	IN	BOOL	1	<ca< td=""><td></td><td></td><td></td><td>\Box</td><td></td><td>1 = Suppress all messages if MsgLoc</td><td></td></ca<>				\Box		1 = Suppress all messages if MsgLoc	
199	Feature.Bit26	IN	BOOL	0	<ca< td=""><td>\Box</td><td></td><td></td><td>\Box</td><td></td><td>1 = Reset switching points if switchi</td><td></td></ca<>	\Box			\Box		1 = Reset switching points if switchi	
•												



Further information on feature bits is available in the APL documentation.

2.1.3 Configuring the panel block of the Industry Library

Insert the panel block "PMotL" of the IL in the CFC. Connect the following connections with each other:

- PMotL.MsgLock_Out ► MotL.MsgLock
- PMotL.IDBNo ► Integer parameter of the panel data block
- MotL.ErrorNum (or any connection apart from ENO)
 PMotL.BlockConnector
- MotL.ErrorNum (or any connection apart from ENO) ▶ PMotL.SelFp1
- **Note** The "BlockConnector" input of the panel interface block must be connected to any output (except "ENO") of the associated APL block. The relevant data for the panel block (for example, status information or messages) are then automatically processed via the panel block and displayed accordingly.

If any connection of the associated APL block is connected to the "SelFp1" or "SelFp2" input, a button will be displayed on the faceplate of the panel interface at execution time; this button opens the associated faceplate of the APL function.





2.2 Configuring the multiple control roomoperation in the control program

In order to ensure that production goes smoothly despite there being several distributed control units (OS, panels), it is essential that operator input is only permitted from one location at any time. To this end, we introduced the multiple control room concept, which is designed around the existing local operator authorization in the APL. The concept provides for hierarchical control room and panel operation with 1 to 8 levels. Each of these 8 levels can be assigned operator authorization from the OS faceplate. These input levels are given user-specific names using an enumeration in PCS 7 or a text list on the Comfort Panel.

2.2.1 Configuring the names of the input levels

You can assign distinct names for the 8 possible input levels. To do this, you will need the enumerations "IL_OpLong" and "IL_OpShort". You can find the enumerations as copy templates in the "IL for PCS 7" library.

Copy both of these enumerations into the AS project and assign dedicated names to the values according to your preferences.

The permitted values for the enumerations are 0, 1, 2, 4, 8, 16, 32, 64 and 128 and correspond to the bits 0..7 of a binary number.

2.2.2 Configuring the "UsrM" block

The "UsrM" block manages the control command acceptance of up to 8 input levels. During runtime, the block can either be operated from the faceplate of the OS ("KeySwitch.Value = FALSE"), or controlled by the process using the input "KeySwLvl" ("KeySwitch.Value = TRUE"). The availability of the level can be defined flexibly using the inputs "Dev01Act" to "Dev08Act".

- 4. Insert the "UsrM" function block from the "IL for PCS 7" library into a CFC.
- 5. Assign parameters to the following inputs:
 - "Dev01Act" to "Dev08Act" FALSE = level not available, TRUE = level available
 - "KeySwitch.Value" FALSE = operation from the OS, TRUE = process mode (KeySwitchLvl = 1 to 8)
 - "MaxLevel" 1 to 8 = maximum usable input levels

Figure 2-4 😼 SewagePlant_MP (Component view) -- D:\Projects\SewagePlant\Sewa_MP 🖃 😼 SewagePlant_MP Object name Display name Value Type Comment 🖹 🎒 PlantA_AS_Pri NoOperation NoOperation Ω Value 🗄 🛗 AS01 💈 ControlRoom ControlRoom Value 1 🗄 🔝 ASOx 🛢 LocalOS LocalOS 2 Value 🗄 🛅 Shared Declarations 💈 Panel1 Panel1 4 Value 🚊 👔 Enumerations 🕴 Panel2 Panel2 8 Value *** SewagePlant_MP (Component view) -- D:\Projects\SewagePlant\Sewa_MP X 💼 Ún 🔟 Eq 🖃 😼 SewagePlant_MP Object name Display name Value Туре Comment 🗄 🎒 PlantA_OS 🚊 🎒 PlantA_AS_Pri NoOperation NOP 0 Value 🗄 🚫 SewagePl 🗄 🔝 AS01 🕴 ControlRoom CR Value 1 . ⊡ · 🞆 AS0x 💈 LocalOS OS 2 Value 🗄 直 Shared Declarations 💈 Panel1 PAN1 4 Value 🖻 🚺 Enumerations 💈 Panel2 PAN2 8 Value IL_OpLong
IL_OpShort 💈 Panel3 PAN3 16 Value 💈 Panel4 PAN4 32 Value 💼 Ünits PAN5 🕴 Panel5 64 Value 👼 Equipment Properties 💈 Panel6 PAN6 128 Value 🗄 🎒 PlantA_OS_Pri 🗄 💊 SewagePlant_Lib

Figure 2-5



2.2.3 Connecting the "UsrM" block

The connection of the "UsrM" block is demonstrated using the motor block of the APL and the associated interface block of the IL, which was already configured in the section <u>"Configuring the APL block"</u>.

- 6. Connect the "Out" output of the "UsrM" block to the "SwitchPerm" input of the panel interface block.
- Connect the "Out" output of the "UsrM" block to the "OpSt_In" input of the APL block. The "OpSt_In" input for the APL block is not usually visible. This connection allows you to jump from motor faceplate to the faceplate of the "UsrM" block on the OS.



2.2.4 Setting the input level for the interface blocks for panels

In order for the faceplate on the Comfort Panel to be operational, the value at the "SwitchPerm" input must match the "PanelPerm" input on the panel interface block.

- 8. Open the CFC that contains the interface block for the comfort panel.
- 9. At the "PanelPerm" parameter, select the desired input level at which this block should have control command acceptance.

Figure 2-7

Properties - Input/Output		×
Block: PMotL.P_DemoMotor 1/0: PanelPerm + IN(DW0	(Inverted)	
Value: Panel1 Panel1 Panel2	Invisible Watched	D Department
Enumeration: Panel3 Panel4 Panel5		P_DemoMotor PMotL Panel in
Comment: Panel Per	mission	Panel1 - PanelPer OSSta
	Archive:	1 AS_Nr Paneli SelFp1 MsgLo
Operator authorization level: 0	OS additional text:	SelFp2 ID 16#1 CmpID DB_Co 0.0 AV1 Msg
- Force	Process object view	0.0 - AV2 0.0 - AV3
 Add forcing Forcing active 	Parameter	0.0 - AV5 0.0 - AV6
Force value:	MES-relevant	
OK	Cancel	Help

Note The values for the input levels are parameterized in the "IL_OpLong" enumeration.

2.3 Compiling and loading the S7 program

If all the configurations to the S7 program are complete, you can compile the control program in the usual way and load it into the automation system, e.g., with the function "Target system > Compile and load objects...".

2.4 Configuring the OS

2.4.1 Creation of the operating image

Configuring the Operator Station largely follows the standard PCS 7 procedure, and will therefore not be described in detail. The following steps provide a brief overview of how the block icons of the IL are generated in the process screen of the OS. To illustrate this, the "Demo" CFC has been configured with the blocks "UsrM", "PMotL" and "MotL".

10. Create a process screen in the same folder of the plant hierarchy, where the CFC is located.

Figure 2-8



- 11. Compile the Operator Station with the menu function "Edit > Compile...". Select the option "Entire OS".
- 12. Open the OS process screen. You can now add all the necessary graphic elements and position the block icons as desired.



(2) Example process image of a pumping station in a sewage treatment plant, consisting of 2 pumps and a level indicator, which were configured as in the previous sections.

Note The time synchronization of the OS values is described in <u>Section 4</u>.

2.4.2 Defining the input level for the OS

The input level for the OS is predefined using the internal tag "@APLOpStation". This tag is generated as standard for every OS project. The faceplate of the OS is then operational if the value at "OpSt_In" matches the value of the tag "@APLOpStation". In other words, the input level set at the "UsrM" block must match the predefined operating level in the OS.

- 13. Open the OS tag management.
- 14. Select the tag "@APLOpStation" from the folder "Internal tags > Split Screen Manager".
- 15. Enter the value of the input level to be used in the "Start value" property for the tag. Note that only these values: 1, 2, 4, 8, 16, 32, 64 and 128 are permitted.

Figure 2-10

1	Properties - Tag	;	⊳			
Ξ	Selection		_			
	Object type	Tag				
	Object name	@APLOpStation				
Ŧ	General					
Ξ	3 Assignment					
	Communication driver					
	Channel unit					
	Connection	Internal tags				
	Group	Split Screen Manager				
+	Linear scaling					
Ξ	Limit Values					
	Low limit					
	Hiah limit					
	Start value	1				
	Substitute value					
Ŧ	Use Substitute Value					
Ŧ	Options					
Ŧ	Various					
÷	Structure tag element					
D	efines the limits, the start value and the su	ubstitute value.				

Note The start value must match the value of the respective input level in the enumeration "IL_OpLong", or match "IL_OpShort".

2.5 Hardware configuration in the TIA Portal

The Comfort Panels are configured using the engineering software "SIMATIC WinCC Comfort (TIA Portal)". In this section, 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

2.5.1 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. Follow these steps to configure the controller in the TIA Portal as a device proxy:

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



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

Figure	2-12
--------	------

Project tree	M Open device proxy data source							
Devices	C v SewagePlant → PlantA_P → v 4 Search PlantA_P							
🖻 O O	Ormania							
	Organize							
 PumpStation 	2	📃 Rec	ent Places	*	Name	Date modified	Туре	^
💣 Add new device					퉬 omgd	11.09.2014 06:18	File folder	
devices & networks		🥽 Librar	ies	-	퉬 pgs	11.09.2014 06:18	File folder	
AS01 [Device Proxy]	Open		uments		퉬 s7asrcom	15.09.2014 08:06	File folder	
Tevice configura	📖 Initialize device pro	ху	ic		퉬 s7extref	11.09.2014 06:33	File folder	
Local modules	🗱 Update device prox	ky data	ures		퉬 S7Netze	22.09.2014 10:08	File folder	
Common data	X Cut	Ctrl+X	os	=	S7NFREMX	22.09.2014 10:08	File folder	
Documentation set	🛅 Сору	Ctrl+C			퉬 sdb	18.09.2014 13:47	File folder	=
Languages & resou	💼 Paste	Ctrl+V	uter		퉬 winccom	11.09.2014 06:18	File folder	_
Online access	🗙 Delete	Del	em (C:)		퉬 YDBs	15.09.2014 08:05	File folder	
🕨 🤄 Card Reader/USB mem	Rename	F2	en1 (D:)		PlantA_P.s7p	22.09.2014 10:41	S7P File	-
	Compile	•		-	•		- F	
	Download to device	e 🕨	F	ile nar	me: PlantA P s7n	 All supported 	files (*.iner*.an13	
	Go online	Ctrl+K			na nana-inarp	, and apported	The (the the	
	Go offline	Ctrl+M			3	Open	Cancel	
	Me Online & diagnostic	cs Ctrl+D						Ъ
	🔍 Properties	Alt+Enter						

20. If more than one controller is configured in the S7 project, you can select which controller (4) you want to use to import the data.

Figure 2-13

Initialize device proxy - AS01	×
Initialize device proxy from project:	Defined device proxy data:
Source device: AS01\CPU 417-4 H [CPU 417-4 H] Comment: 4	Device proxy data content:
	OK Cancel

- 21. Following successful import, you will be able to find all the data blocks of the PLC, such as the panel DB (5) required for configuring the panel, in the TIA project.
- 22. Mark the Ethernet interface (6) for the PLC and select an available subnet in the properties window or create a new subnet (7).



2.5.2 Configuring the panel

Follow these steps to add a panel to the project:

- 23. Select "Add new device" from the project navigation.
- 24. Select the multi panel or comfort panel to be configured (1) and assign a device name (2). In this example a Comfort Panel TP1200 was used. If you have enabled the option "Start device wizard" (3), you can create the panel with a few default settings.



25. 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

Figure 2-16

HMI Device Wizard: TP1200	Comfort Buttons Add buttons with drag-and-c	drop or by clicking on available system buttons.
PLC connections 😪	System buttons	Preview
Alarms	Log on Language	No. Time Date
System screens		
		Button area
Save settings	<< <u>B</u> ack	Next >> Einish Cancel

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

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

Figure 2-17



2.5.3 Configuring HMI connection

If not yet available, configure an HMI connection to the panel with the following steps:

- 28. Switch to the Network view (1) in the device configuration.
- 29. Select the option "Connections" (2) and select "HMI connection" as connection type (3).
- 30. Using the mouse, draw a line between the two Ethernet interfaces (4).
- 31. You can check all the relevant connection parameters (5) in Properties.

igure z-ro							
Project1 🕨 Devices &	networks						_ # i
					📲 Topology view	h Network view	Device view
Network Connect	ons HMI connection	💌 🖭 📰 🛄 🍳 🕯	<u>+</u>			/	=
						4 Highlighte	d: Connection
2 _		3					
		_	4004				
HN TP1	200 Comfort		AS01 Devic	e proxy			
		\sim	HMI_Connection	1_1			_
							_
			4				
					> 13	8%	
General IO tags	System constants	Texts					
General	General						
Protocol setting Access point	Connection						
Time synchronization	connection						
	Name:	HMI_Connection_1					
	Connection path						
		Local	•	F	Partner		
					. .		
	End point:				ASO1 [Device Proxy]		
	End point: Interface:	HM01 HM01.JE_CP_1, PROFINET Inte	rface_1[X1]		ASO1 [Device Proxy] CP 443-1, CP 443-1[X1] Ethernet		
	End point: Interface: Interface type: Subnet:	HM01 HM01.JE_CP_1, PROFINET Inte Ethernet			ASO1 [Device Proxy] CP 443-1, CP 443-1[X1] Ethernet PN/F 1		
	End point: Interface: Interface type: Subnet: Address:	HM01 HM01JE_CP_1, PROFINET Inte Ethernet PN/IE_1 192.168.0.2			ASD1 [Device Proxy] CP 443-1, CP 443-1[X1] Ethernet PN/IE_1 192,168.0.21		

2.6 Configuring the panel project

This section will explain how to create the panel project:

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

Note The time synchronization of the panel project is described in <u>Section 4.2</u>

2.6.1 Retrieving the library

After the "SIMATIC Industry Library WinCC Comfort" package has been installed using the general setup of IL V9.0, you will still have to retrieve the installed WinCC Comfort V14 library. The default location for the "IL_PCS7_V14.ZAL14" library file is in the

"C:\Program Files (x86)\SIEMENS\Industry Library" folder.

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

Figure	2-19
riguio	2 10

.g		
on		
rt Online	Options Tools Window Help	
) X 🗈 🕻	Y Settings	Go online 🖉 Go offline 🛛 🛔 🔣
	Support packages	
	Install general station description file (GSD)	
	Show reference text	
	🛄 Global libraries	Create new library
		🔂 Open library
		Retrieve library

2.6.2 Setting up the project library

Before you make a start on configuration, copy all the necessary functions from the "IL_PCS7_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_PCS7_V14" library. Proceed as follows:

- 32. 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.
- 33. Drag-and-drop all the necessary functions (2) from the IL library into the "Master copies" folder in the project library.

Figure 2-20

1 thurston	
Libraries	
Options	
🛃 Library view	5
✓ Project library	You
	17
	*
	S S
	<u> </u>
General	١ř.
E MonAn	Isti
▶ E Mot	
	Ĭ
	- 5
▼ IL_PCS7_V13	1
Types (2)	Tas
Master copies	ks
En Celevicen	
	÷
MonAn08	1
MonAnDi	es
MonDi	
MonDi08	
Mot	
MotRev	
MotSpd	
MotSndC	' •
> Info (Project library)	

2.6.3 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
- Variable table for the icon
- Variable table for the faceplate

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

If several icons use the same faceplate during configuration, it is necessary to observe the sequence, as shown in Figure 2-21.

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



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.

34. Copy the tags "VisibleST" and "VisibleTag" (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.



Figure 2-22

Follow these steps to configure the motor from the previous section on the panel:

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



- 36. Open the newly created variable tables.
- 37. Select the HMI connection (3) 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.

Figure 2-24

PumpStation → HMI01 [TP1200 Comfort] → HMI tags → Mot_Icon [3] ■ ■ ×										
🦸 🖻 🗄 🐍										
Mot_lcon										
Name 🔺	Data typ	e Connecti	on	PLC name	PLC tag		Address			
Mot\lcon\OP_\	/isibility DWord	HMI_Con	nection_1	AS01	<multip< th=""><th>olex tag></th><th>. %DB[Mot\lcon\l</th><th>Pointer</th><th>r].DB</th></multip<>	olex tag>	. %DB[Mot\lcon\l	Pointer	r].DB	
Mot\lcon\OSS	tate DWord	Connect	ion		<multip< th=""><th>lex tag></th><th>%DB[Mot\lcon\f</th><th>Pointer</th><th>r].DBD2</th></multip<>	lex tag>	%DB[Mot\lcon\f	Pointer	r].DBD2	
- Mot\lcon\Poin	ter Int	Connecti	ion		<under< th=""><th>fined></th><th>%DB25.DBW0</th><th></th><th></th></under<>	fined>	%DB25.DBW0			
<add nown<="" th=""><th></th><th>TD4 200.0</th><th>c .1</th><th></th><th></th><th></th><th>·</th><th></th><th></th></add>		TD4 200.0	c .1				·			
PumpStatio	on ▶ HMIU1[TP1200 Con	nfortj 🕨 f	imi tags 🕨	MOT_F	aceplate	30]	_ ×		
	- 꿃							-		
Mot_Fa	ceplate									
Nam	e 🔺		Data type	Connection PLC name		PLC name	PLC tag			
-00 N	lot\Faceplate\Aux	đ	Real	HMI_Connec	tion_1	AS01	<multiplex tag=""></multiplex>	~		
-00 N	lot\Faceplate\Aux	2	Real	HMI_Connec	tion_1	AS01	<multiplex tag=""></multiplex>	≣		
- N	lot\Faceplate\Aux	3	Real	HMI_Connection_1 AS01		<multiplex tag=""></multiplex>				
	et\Faceplate\Aux	(4	Real	HMI_Connection						
	alorente	ckname	WString	and the second se			No. of Concession, Name	-		
- m	lot/Facer			minner	tion 1	AS01	-01-10-			
	lot\Faceplate\Per	mission		HML Connec	tion 1	AS01	<multiplex tag=""></multiplex>	-		
	lot\Faceplate\Poi	nter	Int	<internal tag<="" th=""><th>15 IS</th><th></th><th><undefined></undefined></th><th></th><th></th></internal>	15 IS		<undefined></undefined>			
<								>	1	
			-	1 - 1	_					
			HMI tag p	arameter						

38. Set the address of the tag "*\Pointer" in the variable table "Mot_Icon" to the parameter (4) in the panel DB intended for this block.

Figure 2-25

PumpStation → HMI01 [TP1200 Comfort] → HMI tags → Mot_lcon [3]								
Mot_lcon								
Name 🔺	Connection	PLC name	PLC tag		Address			
- Mot\lcon\OP_Visibility	HMI_Connectio	AS01	<multiplex tag=""></multiplex>	%	%DB[Mot\lcon\Pointer].DBD38			
- Mot\lcon\OSState	HMI_Connectio	AS01	<multiplex tag=""></multiplex>	%	%DB[Mot\lcon\Pointer].DBD22			
- Mot\Icon\Pointer	HMI_Conne	AS01	ELDB.DB_MOTOR	II %I	%DB25.DBW4			
<add new=""></add>		DB13	6 [DB136]		7			
<		 DB13 DB13 DB13 	7 [DB137] 8 [DB138]	Name	one	Address	Data typ	e 🔨
	_	 DB13 DB14 DB14 	0 [DB140]	DE	3_M401 3_ML401	%DB25.DBW0 %DB25.DBW2	Int Int	≣
		DB14 PANE PANE PLCTin Local ma	LDB [DB25] me [DB10]	4 DE DE DE	3_MOTOR 3_M601 3_M602	%DB25.DBW4 %DB25.DBW6 %DB25.DBW8	Int Int Int	~
	<	iii Show all		<			·	×

- 39. Open a new or existing process screen, e.g. the root screen created using the wizard and defined as the start screen.
- 40. Drag the blocks "Mot" (5) and "PCS7_MotL_Icon" (6) into the process screen. The previously created tags will be automatically linked to these picture objects.



Figure 2-26
41. 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 variable table (7) too.

Figure 2-27

PumpStatio	n → HMI01 [TP1200 Co	omfort] 🕨	HM	l ta	gs → Mot_lcon [3]			_∎∎×
				Ta	sks			
学 🖻 🗄	3			Or	otions			
Mot_lcor	า	_					5	
Name	•	Data type	Conr				as	Address
💷 Mo	tllcon\OP_Visibility	DWord	HMI_	~	Find and replace		ŝ	%DB[Mot\lcon\P 🔺
💷 Mo	t\lcon\OSState	DWord	нм	F	ind:			%DB[DemoMoto≣
💷 Mo	t\lcon\Pointer	Int	HM-		/lot\lcon	-	낕	%DB25.DBW4
<add r<="" th=""><th>new></th><th></th><th></th><th></th><th>Whole words only</th><th></th><th>iii </th><th>*</th></add>	new>				Whole words only		iii	*
<		1111			Match case		ari	>
			ΗN		Find in substructures		ŝ	
					Find in hidden texts		_	
					Use wildcards			
D O U		e .1 .			Use regular expressions			
PumpStatio	n ▶ HMI01 [TP1200 Co	omfort] 🕨	HM	e	Whole document			_ =' = ×
					From current position			
	B2			0	Selection			
	. 7		_	6	Down			
DemoMo	tor			è				
Name	▲ 	Data type	Conr	È	Find			Address
d De	moMotor\lcon\OP_Visibility	Jord	HMI_) a pla co with:			%DB[DemoMote A
d De	moMotor\lcon\OSState	DWord			epiace with.			%DB[DemoMot(≣
De	moMotor\lcon\Pointer	Int	HMI_			_		%DB25.DBW4
<add r<="" th=""><th>iew></th><th></th><th></th><th></th><th>Replace Replace all</th><th></th><th></th><th>¥</th></add>	iew>				Replace Replace all			¥
•				>				>
			HN	-	Languages & lesources			

NOTICE

It is possible to make unintended changes to variables

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. 42. In the Properties box for the block icon, you can check that the relationship between the interface and tag has been retained, in spite of the change to the tag name.





You can now add additional block icons and faceplates with the associated variable table, but make sure to always follow the editing sequence shown in Figure 2-20.

The image below shows, by way of example, the configuration of three motors; the data for these motors will be represented in a faceplate at execution time.

Figure 2-29

Project tree		on → HMI01 [TP1200 Comfort] → Screens → PumpStation 🛛 🗕 🖬 🗮 🗙
Devices		
ڬ O O		B I U S A*±≣± A±±±± ≡±*
Screens	~	
🕨 🔯 Screen management		- Ster AF 180
🛨 🔁 HMI tags		
lage Show all tags		
📑 Add new tag table		
🖳 M101 [3]	_	
🖳 M102 [3]	_	
🖳 M103 [3]		
line [30] 🖳 🕹		
💥 Default tag table [4]		SUSA RESEARCE
🔁 Connections		
🖂 HMI alarms		
📑 Recipes	~	· · · · · · · · · · · · · · · · · · ·
<	>	 75%

2.6.4 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 analog 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.
- Change the value (1) at "Label > Blockname" to the name of the process tag to which the icon is connected.
- 3. Change the value (2) at "Unit > Unit" to the measurement unit for the process value displayed on the icon.

Figure 2-30			
PumpStation > HMI01 [TP120	0 Comfort] > Screens	PumpStation	_∎≡×
10 - B	[<u>U</u> S A [*] ±≣± <u>A</u>	± <u>@</u> ± <u>⊿</u> ± <u>≡</u> ± — ±	
			^
		U <u>I</u> ÓP	
	0000000,0 m		
· · · · · · · · · · · · · · · · · · ·	<u> </u>		✓
< III		> 100%	▼
PCS7_MonAnL_Icon [Screen m	odule insta 📴 Prope	rties 🚺 Info 🔒 🗓 🛙)iagnostics 👘 🗖 🗏 🥆
Properties Interface	Animations Event	s Texts	
12 🖻 🖿			
Name	Static value	Dynamization	
✓ Label	0		
Blockname	N 🎐 ANL601 (1)		
S7_PCS7	N 🍤		
Process			
Unit	N 🎲 m³ (2)		
8			

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

- 4. Switch to the "Events" tab.
- 5. For the tag "Blockname" (3), change the text to the name of the process tag to which the icon is connected.
- 6. Change the text for the tag "UnitPV" (4) to the measurement unit for the process value displayed on the icon.
- 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" (5).

igure 2-31							
Properties							
CS7_MonAnL	_lcon [§	creen i	module instance]	🔍 Properties	🗓 Info 🔒	B Diagnostics
Properties	Inter	face	Animations	Events	Texts		
	1 <u>+</u>	ŦE	∎ ⊨ ×				
MIG Click		:					
		👻 Set	Tag				
			Tag (Output)		MonAn\Faceplate	e\Blockname	3
			Value		ANI 601		\smile
		👻 Set	Tag				
			Tag (Output)		MonAn\Faceplate	els7 PCS7	
			Value		3		
		👻 Set	Tag				
			Tag (Output)		MonAn\Faceplate	e\VisibleFacepla	te
			Value		MonAn\Faceplate	e\S7_PCS7	
		🔻 Set	Taq			_	
			Tag (Output)		MonAn\Faceplate	e\UnitPV	(4)
			Value		m³ .		Ŭ
		👻 Set	tTag				
			Tag (Output)		MonAn\Faceplate	e\UnitGrad	
			Value		m³/s		
		👻 Set	Tag				
			Tag (Output)		MonAn\Faceplate	e\Text_Aux1	
			Value		Aux. Value 1		
		👻 Set	tTag				
	4		Tag (Output)		MonAn\Faceplate	e\Text_Aux2	
			Value		Aux. Value 2		
	•	👻 Set	Tag				
			Tag (Output)		MonAn\Faceplate	e\Text_Aux3	
			Value		Aux. Value 3		
		👻 Set	:Tag				
			Tag (Output)		MonAn\Faceplate	e\Text_Aux4	
		_	Value		Aux. Value 4		
		👻 Set	tTag				
			Tag (Output)		MonAn\Faceplate	e\Unit_Aux1	9
			Value		%		
		▼ Set	tTag				
			Tag (Output)		MonAn\Faceplate	e\Unit_Aux2	
			Value		%		
		▼ Set	tTag				
			Tag (Output)		MonAn\Faceplate	e\Unit_Aux3	
			Value		%		
		▼ Set	Tag				
			Tag (Output)		MonAn\Faceplate	a\Unit_Aux4	
			Value		%		
		<ac< td=""><td>d function></td><td></td><td></td><td></td><td></td></ac<>	d function>				

2.6.5 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 for bits 0-7 to match the configuration of the enumeration "IL_OpLong" in the SIMATIC Manager.

Figure 2-32

Pun	PumpStation + HMI01 [TP1200 Comfort] + Text and graphic lists _ LE X								
						1-	Text lists	🚡 Graphi	c lists
•									
	Text lists								
		Name 🖌			Selection		Comment		
	1-2-	Permissi	ion_PCS7		Bit number (0 - 31) 🔽			
	1- 2-	Permissi	ion_S7		Value/Range				
	1-2-	TextList_	ScreenNames		Value/Range				
		<add ne<="" th=""><th>w></th><th></th><th></th><th></th><th></th><th></th><th></th></add>	w>						
	То	vt liet o	atrios		· · · · ·				
	i e	AL HOLE	innes						
		Default	Bit number 🔺	Text					
	1.	\odot	0	Contr	ol Room				
	1.	\odot	1	Local	OS				
	1.	\bigcirc	2	Pane	11				
	1.	\bigcirc	3	Pane	2				
	1.	\bigcirc	4	Pane	3				
	1.	\bigcirc	5	Pane	4				
	1.	\bigcirc	6	Pane	5				
	1.	\bigcirc	7	Pane	6				
			<add new=""></add>						

Note Further information on the subject of the "Multiple control room concept" can be found in the section "<u>Multiple control room concept</u>"

You have now finished configuring the technological functions for the Comfort Panel.

2.6.6 Creating graphics

You can complete the process pictures with the remaining graphic objects.

Using the layer function in the configuration software makes it easier to create the process pictures.

In the "Layout" tab, you can easily assign all the graphic objects to the different layers. Move all the block icons and faceplates to a higher layer (1). To draw the process screen, you can then hide this layer using the eye icon (2).





Once you have finished the process screen, move the icons and faceplates back to their intended position.





2.6.7 Assigning alarm window parameters

Figure 2-35

When creating the Comfort Panel, the HMI device wizard starts by default. If you leave the proposed options selected in the step "messages", the corresponding message controls are created in the global screen of the panel project.

HMI Device Wizard: TP1200 Cor	Alarms Configure the alarm	settings.
PLC connections		
Screen layout Alarms Screens	Alarms Unacknowledged alarms Alarm window Alarm line top	Preview
System screens	Alarm line bottom Alarm line bottom Pending alarms Active system events	

If a message is triggered by an AS block at execution time, the corresponding message control appears above the current process screen and is displayed until the operator closes the Control.

To assign parameters to the message controls, open the global screen of the panel project.





2-37	HMI_1 [TP1200 Comfort] → Screen	management 🕨 Global	screen	- 4
	ן <u></u>	=++ +_+	.+ ı + ⇔+ of t≈+ G	
SIEMENS			н Щ - Ш - Ч - ч	SIMATIC HMI
Michel quintilerte madulung	-			5
Anatahanda Sy	Zeit Datum Status Text			
	Properties Animatio	ns Events Te	exts	
	Property pages	_		
		-		
	Name 🔺	Static value	Dynamization	
	Alarm filter			
	Alarm line			
	Appearance			
	Button Border			
	Column boaders			
	Columns			
	Display			
	 Flashing 			
	✓ General			
	Alarm classes	System	-	
	Alarm log	Alarm class	Enable	
	Pending alarms	Errors		
	Source of alarms	Warnings		
	Unacknowledged ala	rms System		
···· · · · · · · · · · · · · · · · · ·	Layout	Diagnosis events		
	Miscellaneous			
	 Security 			
	 Styles/Designs 			
	Table header border			
	 Table header fill pattern Toxt format 	<		
	 lexclormat 			
	Toolhar			

The properties of the message controls are shown if you select one of the controls.

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.

2.6.8 Critical messages caused by multiplex tags

The faceplates on the Comfort Panel work with a dynamic pointer tag. When the faceplates are opened by clicking on an icon, this tag is provided with the correct IDB number. The value of the pointer tag is reset to "0" by closing the faceplate. All multiplex tags of the faceplate now show an invalid address range in the AS (DB0.<tags>). This status is displayed on the Comfort Panel by means of a system alarm.

Fig	ure 2-38					
	No.	Time	Date	St	Text	Ack
\$	190004	8:15:11	10/14/2014		Tag MonAn_FP1\Faceplate\En_Aux: PLC address error.	
\$	190004	8:15:11	10/14/2014	I	Tag MonAn_FP1\Faceplate\Op_PV: PLC address error.	0
\$	190004	8:15:11	10/14/2014	Ι	Tag MonAn_FP1\Faceplate\Op_PV_Grad: PLC address error.	0
\$	190004	8:15:11	10/14/2014	I	Tag MonAn_FP1\Faceplate\Permission_S7: PLC address error.	0
\$	190004	8:15:11	10/14/2014	Ι	Tag MonAn_FP1\Faceplate\Permission_PCS7: PLC address err	0
\$	190004	8:15:11	10/14/2014	Ι	Tag MonAn_FP1\Faceplate\OSState: PLC address error.	0
\$	190004	8:15:11	10/14/2014	Ι	Tag MonAn_FP1\Faceplate\OSStateAL: PLC address error.	0
\$	190004	8:15:11	10/14/2014	Ι	Tag MonAn_FP1\Faceplate\Aux1: PLC address error.	0
\$	190004	8:15:11	10/14/2014	I	Tag MonAn_FP1\Faceplate\Aux2: PLC address error.	0
\$	190004	8:15:11	10/14/2014	Ι	Tag MonAn_FP1\Faceplate\Aux3: PLC address error.	0
\$	190004	8:15:11	10/14/2014	I	Tag MonAn_FP1\Faceplate\Aux4: PLC address error.	0
\$	190004	8:15:11	10/14/2014	I	Tag MonAn_FP1\Faceplate\Op_Visibility: PLC address error.	0
\$	190004	8:15:11	10/14/2014	I	Tag MonAn_FP1\Faceplate\Op_ScaleHigh: PLC address error.	0
\$	190004	8:15:11	10/14/2014	Ι	Tag MonAn_FP1\Faceplate\Op_ScaleLow: PLC address error.	0
\$	190004	8:15:11	10/14/2014	Ι	Tag MonAn_FP1\Faceplate\MsgFilter: PLC address error.	0
	?				A	

Every time you switch to a display with a faceplate, or when opening/closing a faceplate, an alarm window with the system alarm "Address error received/sent" is shown for a short duration in front of the process screen.

If you do not want this alarm window to appear over and over again, you can delete the alarm message control for system system alarms from the global screen ("... > Display management > Global screen") and re-insert it into another screen that can be called up manually.

NOTICESystem alarms will no longer be displayed automaticallyIf you remove the system diagnostics window from the global screen, you will
need to configure a separate display to show the system alarms. At execution
time you will then need to invoke this display manually to view the system
alarms.

2.6.9 User-configurable message classes

Since the launch of PCS 7 V8.0 SP1, it has been possible to customize the colors, names and texts of message classes in PCS 7.

Note You can find further information about "User-configurable message classes" (APMK) in PCS 7 at:

http://support.automation.siemens.com/WW/view/en/67373865

If you use this function in your PCS7 project, you can configure the messages on the panel in such way that alarms and messages are displayed with the same texts and colors as in the OS. To this end, other icons and faceplates are used on the panel. These panel interface blocks of IL for PCS 7 can be configured with user-defined displays for the message classes:

- MonAnL
- MonAn08
- MonAnDi
- MonDiL
- MonDi08
- MotSpdCL
- PIDL



The IL V14 includes additional block icons and faceplates for each of these technological components. Alongside their actual label, these have the suffix "APMK" (1). With these blocks, the following properties can be configured for each message type (e.g.: HHH, HH, H, L, LLL):

- <Message type>_Backcolor
- <Message type>_Fontcolor
- <Message type>_Sign
- <Message type>_Text (faceplate only)

Follow these steps to change the representation of the messages:

- 4. When configuring the technological functions, use the block icons and faceplates with the suffix "_APMK".
- 5. Select the block to be changed.
- 6. In Properties, in the "Interface" tab, you will find the "Messages" record. Here, you can change the background color, text color, sign and text for every available message type (2).

Figure 2-12					
PumpStation > HMI01 [TP1200 C	omfort] 🕨 Screer	ns → Scree	en_1 _		
			_		
		A . A .	A		
• B I	U SAYEY	<u>A ± w</u> ±		1 ±	
DCS 7 Teductor Library 00	000000000000000000000000000000000000000				
S & OP					
000000000000000000000000000000000000000	0,0000000000000	0000			
000000000000000000000000000000000000000	00,00000000000	0000			
000000000000000000000000000000000000000		0000			
	,00000000,00			=	
000000000000000000000000000000000000000	00000000,00	0000			
Properties					
MonAnL APM	Screen module	instancel	Properties	ti Info 🕕 🛛	Diagnostics
Grenz					Diagnostics
No. T Properties	Interface	Animations	Events I	exts	
Name		Static	value		Dynamization
 Messages 					^
AbsGra	d_Backcolor	2	55, 0, 0	(2)
AbsGra	d_Fontcolor	2	55, 255, 255	C	
AbsGra	d_Sign	A A			
AbsGra	d_lext	Grenz	wert (unten) für den a	ibsoluten Gradiente	
H Fort			55 255 255		
H Sign		1 <u> </u>	55, 255, 255		
H_Text		Ober	e Toleranzgrenze		
HH_Ba	ckcolor	2	55, 255, 0		
HH_For	ntcolor 📘 🏲	- o	, 0, 0		
HH_Sig	n 🏲	- w			
HH_Te>	t 🏲	Ober	e Warngrenze		
HHH_B	ackcolor	2	55, 0, 0		
HHH_F	ontcolor 🔼 🏲	- <u> </u>	55, 255, 255		
HHH_S					
HHH_Text		A A			
HHH_TO	ign	A Ober	e Alarmgrenze		
HHH_T L_Back	ign	A Ober	e Alarmgrenze , 0, 255 55, 255, 255		
HHH_T L_Back L_Font L_Sian	ign N ext N color N color N	A Ober	e Alarmgrenze , 0, 255 55, 255, 255		

2.6.10 Loading the panel

To load the Comfort Panel, select the command "Load to device > Software (load completely)" in the shortcut menu for the HMI station. For the initial loading of the Comfort Panel, the "Extended download" dialog is displayed.

Note The communication or transmission of project data from the ES to the Comfort Panel only operates via the standard network adapter, not via the CP1613 or the CP1623.

Figure 2-13 Extended download to device X Configured access nodes of "HMI01" Device Slot Address Subnet Device type Туре 10.0.8.10 HMI01 TP1200 Comfort Ethernet HMI_RT_1 S7USB HMI01.IE_CP_1 PROFINET Interface 51 PN/IE 10.0.8.10 PN/IE_1 HMI01.MPI/DP_CP_1 7 X2 MPI/DP Interface MPI 1 Type of the PG/PC interface: PN/IE -1 🗖 🖲 💽 Intel(R) PRO/1000 MT Network Connection PG/PC interface: Connection to interface/subnet: PN/IE_1 🖃 🐑 🖃 🖲 1st gateway Show all compatible devices Compatible devices in target subnet: Device Device type Address Target device Type advanced SIMATIC-HMI PN/IE 10.0.8.10 Flash LED 2 <u>S</u>tart search Online status information: Retrieving device information... ^ Scan and information retrieval completed. ¥ Display only problem reports 3 Load Cancel

Make the following settings:

- (1) Select the settings according to your configuration.
- (2) Start the search for the Panel on the network and wait until the scan is complete.
- (3) Click the "Load" button.

Figure 2-	-14								
Load pro	Load preview X								
?	ompil	ing before downloading	to device						
Status	1	Target	Message	Action					
↓	0		Ready for loading.	· · ·					
				4					
	0	Overwrite	Overwrite if object exists online?	🗹 Overwrite all					
	0	HMI Runtime	Device informations						
				¥					
<			1111	>					
	Refresh								
			Finish Lo	Dad Cancel					

- (4) Check the "Overwrite all" option.
- (5) Start the transfer by clicking the "Load" button.

Note If problems occur when loading multi-panels, make sure to activate the transfer mode on the panel and change the transfer mode to "Ethernet" if necessary.

3 Panel connection to an H-CPU

In general the configuration of the actual control program with an H-system is identical to configuration with a single CPU. However to configure the Operator Panel on an H-system, a dedicated connection is needed to each CPU. A connection is additionally configured on the Operator Panel to receive the connection to the active CPU (Master) at execution time.

The "H_STATUS" function block is built into the S7 program and provides the panel with the information as to which CPU is Master or Standby.

You can obtain the function block "H_STATUS" at the following article:

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

The following sections show you how the connection is switched by means of the "ChangeConnection" function on the Comfort Panel.

3.1 How do you read out the operating state and status of an H system?

To read out the status of the H-CPU, configure the "H_STATUS" block in a CFC and connect the output signals to a user-defined data block.

- 1 Create a data block (e.g., DB24) in the user area with the following parameters:
 - R0_CPU_STATE BOOL
 - Reserve0 BYTE
 - R1_CPU_STATE BOOL
 - Reserve1 BYTE

The reserve bytes are created so that the second status bit receives the next address to the word limit. In WinCC Comfort, at least one byte per status is required for configuration.

Figure 3-1

ŧ	🎼 LAD/STL/FBD - [DB24 "HCPU_STATE" PlantA_AS_Prj\AS02_H\CPU 417-4 H(1)\\DB24] 👝 💷 📧								
	🖬 File Edit Insert PLC Debug View Options Window Help 📃 🖅 🗙								
	🗅 🚅 🏪 🛃 🛃 ち 🖻 💼 🗠 🕫 🕼 🎽 🖂 🎥 🎯 !« >>! 🗖 🖪 🔖								
	Address	Name	Туре	Initial value	Comment				
	0.0		STRUCT						
	+0.0	R0_CPU_STATE	BOOL	FALSE	State of H-CPU Rack 0				
	+1.0	Reserve0	BYTE	B#16#0	Reserve				
	+2.0	R1_CPU_STATE	BOOL	FALSE	State of H-CPU Rack 1				
	+3.0	Reserve1	BYTE	B#16#0	Reserve				
	=4.0		END_STRUCT						
F	Press F1 to ge	et Help.	[9 offline	Abs < 5.2 Insert				

- 7. Insert the "H_STATUS" block in a CFC and connect the following outputs to the parameters of the DB:
 - R0_MSTR ► R0_CPU_STATE
 - R1_MSTR ► R1_CPU_STATE

The block can be built into a watchdog alarm OB with a long cycle time (e.g. OB33 with 500ms).



CPU_STATE			
HSTATE	0705		
HSTATE	1/1		
	ERR	—	
	ERR_CODE	—	
	R0_RUN	—	
	R0_MSTR		"HCPU_STATE".R0_CPU_STATE DB24.R0_CPU_STATE
	R1_RUN	—	
	R1_MSTR		"HCPU_STATE".R1_CPU_STATE_DB24.R1_CPU_STATE
	SYNCLINK	—	
	H0_COND	—	
	H1 COND		

3.2 Configuring hardware in the TIA portal

Configure the hardware as described in Section "2.5 Hardware configuration in the TIA Portal". Consider the H-CPU as a single CPU.

In the Network view, configure an HMI connection with the name "RedConn" (1).



3.3 Configuring connections in WinCC Comfort

In order to use an H-system with a Panel, you require 3 connections. These are:

- Connection 1: "RedConn" change connection
- Connection 2: Connection to H-CPU Rack 0
- Connection 3: Connection to H-CPU Rack 1

A tag is configured for each of connections 2 and 3 to monitor the status of the H-CPU. These monitoring tags are configured so that if the value changes, the change connection is switched over to the active Master of the H-system.

All other tags in the panel project are configured with the change connection.

In this case, the "ReConn" connection, which has been configured from the HMI device to the proxy PLC, is used as a change connection.

Manually configure two further connections to the H CPU with the "Add" (1) function:

- Conn_H0 (connection to the H-CPU rack 0)
- Conn_H1 (connection to the H-CPU rack 1)

Figure 3-4

TimeSyncH → HMI_1 [TP1200 Comfort] → Connections _ ■ ■ ■ ×									
A Connections to S7 PLC	P Connections to S7 PLCs in Devices & Networks								
Connections									
Name	Communication driver HMI Station Partner Node Or								
RedConn	SIMATIC \$7 300/400		DeviceProxy-Station_1	H-CPU	Device proxy, PN interface (RO/S3)			
Conn_H0	SIMATIC \$7 300/400								
Conn_H1	SIMATIC S7 300/400	•							
<add new=""></add>									
<						>			
Parameter Area pointer TP1200 Comfort Interface: ETHERNET Interface:									
HMI device	HMI device PLC								
Address:	Address: 10 . 0 . 8 . 10 Address: 10 . 0 . 8 . 36								
Access point: S7ONLINE Expansion slot: 3									
					Rack: 1				
	Cyclic operation:								

3.4 Configuring monitoring tags

8. Create two tags with the following properties:

Tag 1:

- Name: ChangeConn_H0
- Data type: BYTE
- Connection: Conn_H0
- Address: DB24.DBB0
- Acquisition mode: Cyclic continuous
- Area: Bottom 2 = 0 / Top 2 = 0

Tag 2:

- Name: ChangeConn_H1
- Data type: BYTE
- Connection: Conn_H1
- Address: DB24.DBB2
- Acquisition mode: Cyclic continuous
- Area: Bottom 2 = 0 / Top 2 = 0

Figure 3-5

	🖻 🗄 🟅						
F	RedMonitoring						
	Name 🔺		Data type	Connection	PLC name	PLC tag	Address
4	ChangeCor	nn_HO	Byte	HMI_Conne	AS_RED01	<undefined< td=""><td>></td></undefined<>	>
4	ChangeCor	nn_H1	Byte	HMI_Connecti	o AS_RED01	<undefined< td=""><td>> %DB24.DB</td></undefined<>	> %DB24.DB
erties							
ngeConn	_H0 [HMI_Tag]]			💁 Proper	ties 🗓 Info 🚺 🗓	Diagnostics
perties	Events	Texts					
		Settings					
neral		Settings	;				
nge		A	cauisition mode:	Cyclic continuous			-
near scalin	• p		Acquisition cycle:	-			
lues	Droportion						
mment	Properties						
ultiplexin	ChangeConn_h	H0 [HMI_Tag	1]			Properties 1	Info 😟 🖞 Diagnost
od Manu	Properties	Events	Texts				
			Range				
	General						
	Settings		Settings				
	Range		Upper 2:	0			Const
	Linear scaling	4	Upper 1				Ø
	Values		Lower 1:				
	Comment	-	Lower L.				0
	Multiplewig 7		Louis 2				

9. Configure the event on the tags:

Tag 1:

- Trigger: If exceeded
- Event: ChangeConnection
- Target connection: RedConn
- Address, Slot and Rack: (like "Conn_H0" connection)

Tag 2:

- Trigger: If exceeded
- Event: ChangeConnection
- Target connection: RedConn
- Address, Slot and Rack: (like "Conn_H1" connection)

Figure 3-6



3.5 Configuring the technological blocks

Proceed as described in section "<u>2.6 Configuring the panel project</u>". However for all process tags, use the change connection instead of the direct connection to the CPU.

Figure	3-7							
pSta	ation 🕨 HMI01 [TP1200 Com	fort] 🕨 HMI tags	Mot_HCPU [3]	_ = = ×				
	2 🖶 🗄 🐛							
Mo	Mot_HCPU							
	Name 🔺	Data type	Connection	PLC name				
	Mot_HCPU\lcon\OP_Visibility	DWord	RedConn					
	Mot_HCPU\lcon\OSState	DWord	RedConn					
	Mot_HCPU\lcon\Pointer	Int	RedConn					
	<add new=""></add>							
	HMI tag parameter							

The HMI tags for the technological blocks will then always maintain a connection to the Master CPU of the H-system.

Figure 3-8	
SIEMENS	SIMATIC HMI
SIEMENS SIMATIC HMI	▼ 10/20/2014 7:45:17 AM
Status H-CPU Rack 0 (Connection: Conn_H0) 1 Status H-CPU Rack 0 (Connection: Conn_H1) 0	UCF
Status H-CPU Rack 0 (Connection: RedConn) 1 Status H-CPU Rack 1 (Connection: RedConn) 0	
SIEMENS	SIMATIC HMI
	√ 10/20/2014 7:45:17 AM
Status H-CPU Rack 0 (Connection: Conn_H0) Status H-CPU Rack 0 (Connection: Conn_H1)	
Status H-CPU Rack 0 (Connection: RedConn) Status H-CPU Rack 1 (Connection: RedConn)	
Mot HCPU Mot_HCPU Mot_HCPU Mot_HCPU Mot_HCPU Mot_HCPU	ary Commend
Paneli	Reset

© Siemens AG 2019 All rights reserved

4 Time synchronization

4.1 Time synchronization of AS and OS

4.1.1 Synchronization using the SIMATIC process

The OS server is the time-of-day master. OS clients and automation systems are slave clocks. The time should be set to Coordinated Universal Time (UTC) throughout the entire system.

Note Depending on the CPU used, only the NTP method may be used for clock synchronization. You can find information about available methods of clock synchronization of your CPU in the relevant manuals.

Configuring the OS server as time-of-day master

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

Figure	1-1-1
гigure	4-4-1

General Settings	1	OK	ר I	
Use time reception service		ÜK		
Deactivate time synchronization		Cancel		
Synchronization via Terminal Bus (Slav	ve)			
O Use the time from a connected Win	CC server			
O Use the time from a specific compute	ter:			
Computer 1:				
Computer 2:				
Permit time set by external (3rd - p Synchronization via System Bus (Mast	arty) components ter, Slave)			
Permit time set by external (3rd - p Synchronization via System Bus (Mast Access point 1 Intel(R) PRO/1000 MT Network Con	arty) components ter, Slave) nectior	ster (1)		
Permit time set by external (3rd - p Synchronization via System Bus (Mast Access point 1 Intel(R) PRO/1000 MT Network Con Access point 2	arty) components ter, Slave) nectior	ster (1)		
Permit time set by external (3rd - p Synchronization via System Bus (Mast Access point 1 Intel(R) PRO/1000 MT Network Con Access point 2	arty) components ter, Slave) nectior	ve 1		
Permit time set by external (3rd - p Synchronization via System Bus (Mast Access point 1 Intel(R) PRO/1000 MT Network Con Access point 2 Access point 2 Display symbolic nar	arty) components ter, Slave) mectior Mas Mas Slav Mas Slav Slav Slav Slav	tter (1) tter re s		
Permit time set by external (3rd - p Synchronization via System Bus (Mast Access point 1 Intel(R) PRO/1000 MT Network Con Access point 2 Access point 2 Display symbolic nar Process Control Messages	arty) components ter, Slave) nection Ma: Ma: Slav me of the access point Project Doc	ster (1) eter re s umentation		
Permit time set by external (3rd - p Synchronization via System Bus (Mast Access point 1 Intel(R) PRO/1000 MT Network Con Access point 2 CNONE> Display symbolic nar Process Control Messages Send once	arty) components ter, Slave) nectior	tter 1 eter ve s umentation rint		

as slave clock

- 16. Open the OS client projects in succession.
- 17. Open the "Time Synchronization" editor.
- 18. Select the option "Synchronization via Terminal Bus" (2).
- 19. Select the option "Use the time from a connected WinCC server".
- 20. Save the changes and load the OS.

Figure 4-4-2	
Time Synchronization - [OS(1).mcp]	? <mark>×</mark>
General Settings	OK
Use time reception service	
Deactivate time synchronization	Cancel
Synchronization via Terminal Bus (Slave)	(2)
Ouse the time from a connected WinCC	server
O Use the time from a specific computer:	
Computer 1;	
Computer 2;	
Permit time set by external (3rd - part)	/) components
Synchronization via System Bus (Master,	Slave)
Access point 1	
	Master
Among anish 2	Slave
Access point 2	Master
· · · · · · · · · · · · · · · · · · ·	Slave
Display symbolic name of	of the access points
Process Control Messages	Project Documentation
Send once	Print
Send every minutes	Preview
	Setup

Configuring the automation system as slave clock

- 21. Open the hardware configuration for the AS.
- 22. Open the properties for the CP and switch to the "Time-of-Day synchronization" tab.
- 23. Select the option "Forward time of day" in the "SIMATIC Mode" group box (3).
- 24. Open the properties for the CPU and switch to the "Diagnostics/Clock" tab.
- 25. Select the synchronization type "As slave" in the AS (4).
- 26. Save and compile the changes and load the hardware configuration.

Figure 4-4-3	3			
Properties - O	CP 443-1 - (R0/S5)		X	
General Ac SIMATIC Forward Use of	ddresses Options Time-of-Da Mode ard time of day corrected time	y Synchronization IP Access Pro	tection Diagnostics	
NTP Mo	Properties - CPU 416-3 PN/I	DP - (R0/S3)		-X -
E Activ	General Startup Synchro	nous Cycle Interrupts Cycle/Cloc terrupts Cyclic Interrupts Di	k Memory Retentive Memory agnostics/Clock Protection	y Memory
NTP ser	System Diagnostics	P gered reporting of SFB33-35 ne diagnostics buffer:	3000	
Time zor	Clock	0 I		
Update i (Range i	4 In the PLC:	Synchronization Type As slave	None	
	On the MPI:	None	None	
	On the MFI:	None	None	
	Correction factor:	0 ms		
	ОК		Cancel	Help

Note You can find further information about time synchronization in the PCS 7 environment in the following manual:

https://support.industry.siemens.com/cs/ww/en/view/109754988

4.1.2 Synchronization in the NTP process

In the NTP process, 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.

Note You can find further information about time synchronization in the PCS 7 environment in the following manual:

https://support.industry.siemens.com/cs/ww/en/view/109754988

4.2 Time synchronization panel

The Comfort Panels are synchronized with the AS. In order to configure the control program and the panel, you need the following components:

- 12-byte data block (AS)
- System function block "READ_CLK" (AS)
- Global area pointer "Date/Time PLC" (panel)

Creating a data block

The area pointer in the panel requires a 12-byte data storage area in the AS. Since the data type "DATE_AND_TIME" only occupies 8 bytes, you need to add 4 more unused bytes to the DB.

Create a data block with one DB no. in the area reserved for other applications, by using the following parameters:

- Name: "SPS_TIME", type: "DATE_AND_TIME"
- Name: "RESERVE", type: "ARRAY [0..3] OF BYTE"

Figure 4-4-4

🗱 LAD/STL/FBD - [DB10 "PLCTime" PlantA_AS_Prj\AS01\CPU 410-5H\\DB10]							
File E	dit Insert PL	C Debug View	Options Window	v Help _ B ×			
□ 😅 🔓 🖬 🛃 🖄 🖻 🛍 🗠 🗢 [6% 📩] 🖘 🚱 ! ! < >! 🗖 🖳 💦							
Address	Name	Туре	Initial value	Comment			
0.0		STRUCT					
+0.0	SPS_TIME	DATE_AND_TIME	DT#90-1-1-0:0	Time for Comfort Panels			
+8.0	RESERVE	ARRAY[03]		Placeholder			
*1.0		BYTE					
=12.0		END_STRUCT					
Press F1 to g	et Help.		offline	Abs < 5.2 Insert Chg			

Reading out PLC time

You can read out the system time of the AS from the IL using the system function SFC1 - READ_CLK or with the function block FB60 - LOC_TIME (FB60).

Proceed as follows:

- 27. Create a new CFC.
- 28. Add the system function READ_CLK (1) for the UTC time or the function block LOC_TIME (2) of the Industry Library for the local time in the chart.
- 29. Connect the output CDT or LT to the SPS_TIME parameter you created previously in the DB.
- 30. Compile and load the control program.

Figure 4-4-5	
Set Time of Day	
Path: SewagePlant_Pr[\SIMATIC 400(1) Online: ① Order No.: 6ES7 841-0CC05-0YA5 Name: Date: Time of Day:	
PG/PC time: 12/01/2015 01:21:01 PM	SPS_TIME_UTC READ_CLR OB35 Read Sys 1/1
Module time: 12/01/2015 12:21:01 PM	RET_VAL = 0 CDT = 15-12-01-12:21:01 "PLCTime".SPS_TIME DB10.SPS_TIME SPS_TIME LOC
Less << Local time: 12/01/2015 01:21:01 PM	LOC_TIME OBS5 Calculat 1/2 RET_VAL - 0 LI - 15-12-01-13:21:01 "PLCTime".SPS TIME DB10.SPS TIME
Time difference compared to time on the module:	SUMMER -0
☐ Indicate as daylight saving time Current status of the module:	
Module/local time difference: +1h Time is standard time	
Apply Close Help	

Configuring the panel 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.

Carry out the following steps:

- 31. In the TIA portal, open the panel connections.
- 32. Switch to the "Area pointer" tab.
- 33. Configure the global area pointer as "Date/Time PLC". For the address, enter the DB with the parameter "SPS_TIME".
- 34. Compile and load the panel project.

Figure 4-4-6

PumpStation > HMI_1 [TP1200 Comfort] > Connections								∎×∎									
\Lambda Con	nections to S7 F	PLCs i	n Devices & N	etworks													
Con	nections																
- 1	Name		Communica	ation driver	HMI tim	e s S	Station		F	Partner	Node				Online	Comment	
品	HMI_Connectio	n_1	SIMATIC S7	300/400		0	DevicePro	xy-Station	_1 /	AS01	PLC_Pro	oxy, P	N interfa	ce (RO/S3)			
	<add new=""></add>																
<								11	1								>
Dara	motor A		naintar					-	•								
Para	neter A	rea	pointer														
Acti	ve Display nar	ne	PLC tag	Access mo	de	Addre	ss	Length	Acc	uisition	mode	Acqu	uisition cy	/cle	Comment	1	
	Coordinati	on	<undefined></undefined>	<symbolic< td=""><td>access></td><td></td><td></td><td>1</td><td>Сус</td><td>lic conti</td><td>inuous</td><td><un< td=""><td>defined></td><td></td><td></td><td></td><td></td></un<></td></symbolic<>	access>			1	Сус	lic conti	inuous	<un< td=""><td>defined></td><td></td><td></td><td></td><td></td></un<>	defined>				
	Date/time		<undefined></undefined>	<symbolic< td=""><td>access></td><td></td><td></td><td>6</td><td>Сус</td><td>lic conti</td><td>inuous</td><td><un< td=""><td>defined></td><td></td><td></td><td></td><td></td></un<></td></symbolic<>	access>			6	Сус	lic conti	inuous	<un< td=""><td>defined></td><td></td><td></td><td></td><td></td></un<>	defined>				
	Job mailbo	x	<undefined></undefined>	<symbolic< td=""><td>access></td><td></td><td></td><td>4</td><td>Сус</td><td>lic conti</td><td>inuous</td><td><un< td=""><td>defined></td><td></td><td></td><td></td><td></td></un<></td></symbolic<>	access>			4	Сус	lic conti	inuous	<un< td=""><td>defined></td><td></td><td></td><td></td><td></td></un<>	defined>				
	Data recor	d	<undefined></undefined>	<symbolic< td=""><td>access></td><td></td><td></td><td>5</td><td>Сус</td><td>lic conti</td><td>inuous</td><td><un< td=""><td>defined></td><td></td><td></td><td></td><td></td></un<></td></symbolic<>	access>			5	Сус	lic conti	inuous	<un< td=""><td>defined></td><td></td><td></td><td></td><td></td></un<>	defined>				
<									11								>
Global area pointer of HM dovice																	
Con	nection		Display name	PI C tac	,		Assess mode Address Length Assurption mode Assurption over			Acquisition cycle	6						
<un< td=""><td>defined></td><td></td><td>Project ID</td><td><unde< td=""><td>fined></td><td></td><td><symbol< td=""><td>lic access</td><td>></td><td>, laares</td><td>-</td><td></td><td>1</td><td>Cyclic co</td><td>ntinuous</td><td><undefined></undefined></td><td></td></symbol<></td></unde<></td></un<>	defined>		Project ID	<unde< td=""><td>fined></td><td></td><td><symbol< td=""><td>lic access</td><td>></td><td>, laares</td><td>-</td><td></td><td>1</td><td>Cyclic co</td><td>ntinuous</td><td><undefined></undefined></td><td></td></symbol<></td></unde<>	fined>		<symbol< td=""><td>lic access</td><td>></td><td>, laares</td><td>-</td><td></td><td>1</td><td>Cyclic co</td><td>ntinuous</td><td><undefined></undefined></td><td></td></symbol<>	lic access	>	, laares	-		1	Cyclic co	ntinuous	<undefined></undefined>	
<un< td=""><td>defined></td><td></td><td>Screen numb</td><td>er <unde< td=""><td>fined></td><td></td><td><symbol< td=""><td>ic access</td><td>></td><td></td><td></td><td></td><td>5</td><td>Cyclic co</td><td>ntinuous</td><td><undefined></undefined></td><td></td></symbol<></td></unde<></td></un<>	defined>		Screen numb	er <unde< td=""><td>fined></td><td></td><td><symbol< td=""><td>ic access</td><td>></td><td></td><td></td><td></td><td>5</td><td>Cyclic co</td><td>ntinuous</td><td><undefined></undefined></td><td></td></symbol<></td></unde<>	fined>		<symbol< td=""><td>ic access</td><td>></td><td></td><td></td><td></td><td>5</td><td>Cyclic co</td><td>ntinuous</td><td><undefined></undefined></td><td></td></symbol<>	ic access	>				5	Cyclic co	ntinuous	<undefined></undefined>	
HM	_Connection_1		Date/time PL	C PLCTim	ne.SPS_TIM	/E	<absolut< td=""><td>te access</td><td>></td><td>%DB10</td><td>.DBX0.0</td><td>-</td><td>6</td><td>Cyclic co</td><td>ntinuous</td><td>10 s .</td><td></td></absolut<>	te access	>	%DB10	.DBX0.0	-	6	Cyclic co	ntinuous	10 s .	
								>									

4.3 Time synchronization with an H-system

The time synchronization of a Comfort Panel with an H-system is no different to that of a single system. However, the parameters of the global area pointer "Date/Time PLC" are assigned with the AC Connection "RedConn" (1). Configure the time synchronization, as described in section "<u>4.2 Time synchronization</u>".

Figu	re 4	4-4-7

PumpSta	ation 🕨 H	imio1 [tp1200	Comfort]	► Co	onn	ections									₽∎×
\Lambda Conne	ections to S7	7 PLCs in Devices 8	& Networks												
Conn	ections														
Na	ame	Communication	n driver	H S	tatio	n	Partner	Node					Online	Comm	ient
din Re	edConn	SIMATIC S7 300	/400	DeviceProxy-Station_1		eProxy-Station_1	H-CPU	Device proxy, PN interface (R0/S3)		(RO/S3)					
2 Co	onn_H0	SIMATIC S7 300	/400												
2 Co	onn_H1	SIMATIC S7 300	/400												
<^	Add new>														
Param	eter	Area pointer													
Active	e	Display na	me	PLC t	tag		Access m	ode		A	ddress	Length	Acquisiti	on mod	e A
		Coordinat	ion	<un< td=""><td>defir</td><td>ned></td><td><symboli< td=""><td>c access</td><td>></td><td></td><td></td><td>1</td><td>Cyclic co</td><td>ntinuou</td><td>is <</td></symboli<></td></un<>	defir	ned>	<symboli< td=""><td>c access</td><td>></td><td></td><td></td><td>1</td><td>Cyclic co</td><td>ntinuou</td><td>is <</td></symboli<>	c access	>			1	Cyclic co	ntinuou	is <
		Date/time		<undefin< td=""><td>ned></td><td><symboli< td=""><td>c access</td><td>></td><td></td><td></td><td>6</td><td>Cyclic co</td><td>ntinuou</td><td>> zi</td></symboli<></td></undefin<>		ned>	<symboli< td=""><td>c access</td><td>></td><td></td><td></td><td>6</td><td>Cyclic co</td><td>ntinuou</td><td>> zi</td></symboli<>	c access	>			6	Cyclic co	ntinuou	> zi
		Job mailb	ox	<undefin< td=""><td>ned></td><td><symboli< td=""><td>c access</td><td>></td><td></td><td></td><td>4</td><td>Cyclic co</td><td>ntinuou</td><td>IS <</td></symboli<></td></undefin<>		ned>	<symboli< td=""><td>c access</td><td>></td><td></td><td></td><td>4</td><td>Cyclic co</td><td>ntinuou</td><td>IS <</td></symboli<>	c access	>			4	Cyclic co	ntinuou	IS <
		Data reco	rd	<uno< td=""><td>defir</td><td>ned></td><td><symboli< td=""><td>c access</td><td>></td><td></td><td></td><td>5</td><td>Cyclic co</td><td>ntinuou</td><td>is <</td></symboli<></td></uno<>	defir	ned>	<symboli< td=""><td>c access</td><td>></td><td></td><td></td><td>5</td><td>Cyclic co</td><td>ntinuou</td><td>is <</td></symboli<>	c access	>			5	Cyclic co	ntinuou	is <
<						1111									>
Globa	al area po	inter of HMI de	evice				1								
Conne	ection	Display name	PLC tag			Access mode	Address			Length	Acquisi	tion mode	e Acquis	tion	Comme
<und< td=""><td>efined 1</td><td>Project ID</td><td><undefined< td=""><td>></td><td></td><td><symbolic access=""></symbolic></td><td></td><td></td><td></td><td>1</td><td>Cyclic c</td><td>ontinuou</td><td>s <under< td=""><td>ined></td><td></td></under<></td></undefined<></td></und<>	efined 1	Project ID	<undefined< td=""><td>></td><td></td><td><symbolic access=""></symbolic></td><td></td><td></td><td></td><td>1</td><td>Cyclic c</td><td>ontinuou</td><td>s <under< td=""><td>ined></td><td></td></under<></td></undefined<>	>		<symbolic access=""></symbolic>				1	Cyclic c	ontinuou	s <under< td=""><td>ined></td><td></td></under<>	ined>	
<pre><undefined: <ur<="" number="" pre="" screen=""></undefined:></pre>		<undefined< td=""><td colspan="2">defined> <symbolic< td=""><td><symbolic access=""></symbolic></td><td colspan="2">> 5</td><td>5</td><td colspan="2">Cyclic continuous</td><td>s <under< td=""><td>ined></td><td></td></under<></td></symbolic<></td></undefined<>	defined> <symbolic< td=""><td><symbolic access=""></symbolic></td><td colspan="2">> 5</td><td>5</td><td colspan="2">Cyclic continuous</td><td>s <under< td=""><td>ined></td><td></td></under<></td></symbolic<>		<symbolic access=""></symbolic>	> 5		5	Cyclic continuous		s <under< td=""><td>ined></td><td></td></under<>	ined>			
RedCo	onn	Date/time PLC	PLCTime.PL	C_TIME		<absolute access=""></absolute>	%DB10.	DBX0.0	•	6	Cyclic c	ontinuou	s 1 h		
<									_						>

5 Alternative configurations

5.1 Assigning operator authorization on the panel

As an alternative to the principle shown in the Section "<u>Hierarchical operating</u> <u>concept</u>" for the assignment of operating authorizations, since the Industry Library V8.2 there is also the possibility to control the operating authorizations via a panel.

Note However, it is recommended that operating authorizations only be allowed from one location at a time in order to avoid inconsistencies during operation. This means that the user authorizations should be controlled either by a single panel or by the OS.

The configuration of the operator control via the panel is similar to that of a motor, as described in the section "<u>Configuration and project planning</u>". To control the operating authorization via the panel, the "UsrM" block is connected with the equivalent "PUsrM" block for the panel. The WinCC Comfort V14 library ("IL for WinCC Comfort") provides corresponding image blocks and symbols for operation on the panel.

5.1.1 Configuration of "PUsrM" in the S7 program

- 35. 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.
- 36. For each new interface block, create a parameter of type "INT" in the data block.

Figure 5-	1
-----------	---

DB25 "PANEL_DB" Panel_Integration_Prj\SIMATIC H Station(1)\CPU 417-4 H\\DB25						
Address	Name	Туре	Initial valu	Comment		
0.0		STRUCT				
+0.0	DB_Pump1	INT	0	Pump1		
+2.0	DB_Pump2	INT	0	Pump2		
+4.0	DB_MotorDemo	INT	0	Motor for demonstration		
+6.0	DB_Level	INT	0	Level		
+8.0	DB_P_USRM	INT	0	User Management on Panel		
=10.0		END_STRUCT				

- 37. Open the properties of the already configured "UsrM" block. In the "I/Os" tab, switch the following connections to visible:
 - "MsgLock"
 - "ErrorCode" or any other output of your choice (except "ENO"), in order to link the block to the "BlockConnector" connection of the panel block.
- 38. Enable the block functions "Local authorization" and "Suppress messages". Set the following feature bits to TRUE:
 - Feature.Bit24 local operator authorization
 - Feature.Bit25 suppress all messages if MsgLock = 1
- 39. Set the input KeySwitch.Value = TRUE to avoid operator authorizations being granted from the OS.

- 40. Insert the panel block "PUsrM" of the IL in the CFC. Connect the following connections with each other:
 - PUsrM.MsgLock_Out ► UsrM.MsgLock
 - PUsrM.IDBNo > Integer parameter of the panel data block
 - UsrM.ErrorCode (or any connection apart from ENO)
 PUsrM.BlockConnector
- 41. The output UsrM.Out can be connected as before with the corresponding inputs SwitchPerm or OpSt_In of the APL and IL blocks.

Figure 5-2



42. Compile and download the S7 program as usual.

5.1.2 Configuration of the 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 section "<u>Configuring the panel project</u>".

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

1. 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.

Figure 5-3



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



▼ 🛅 HMI01 [TP1200 Comfort]	Librarios	- 1 m r
Device configuration	Libraries	
🖫 Online & diagnostics	Options	
🍟 Runtime settings	Library view	
Screens		
🕨 🔯 Screen management	✓ Project library	
🔻 📜 HMI tags		
🍇 Show all tags	🕨 🔚 Mot	^
💕 Add new tag table	MotRev	
<table-of-contents> Default tag table [4]</table-of-contents>	🕨 🔚 MotSpd	
🍓 DemoMotor [3]	MotSpdC	
🍓 MonAn_Faceplate [31]	🕨 🔚 OpA	
lonAn_lcon [4]	🕨 🔚 OpD	
🍓 Mot_Faceplate [30]	🕨 🔚 PID	
🖳 Pump1 [3]	🔻 🔚 UsrM	
🍓 Pump1_2_Faceplate [30]	PCS7_UsrM_Icon	
堤 Pump2 [3]	EN HerM	
🖳 RedMonitoring [2]	2 UsrM_Faceplate	
II. Tas table Destands [2]	UsrM_lcon	
UsrM_Faceplate [31]	VIv	
UsrM_lcon [5]	🕨 🔚 VlvMot	
😋 Connections	VivPosL	=
M HMI alarms		

- 3. Open the newly created variable tables.
- 4. Select the HMI connection (3) 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 variable table "UsrM_Icon" to the parameter (4) in the panel DB intended for this block.

Figure 5-5

Comf	ComfortPanelIntegrationDemo → HMI01 [TP1200 Comfort] → HMI tags → UsrM_Icon [5]					
1	∍ 🗄 🐁					
U	srM_lcon					
	Name 🔺	Data type	Connection	PLC name	PLC tag	Address
	UsrMlcon\Op_Visibility	DWord	HMI_Conne	AS_RED01	<multiplex tag=""></multiplex>	%DB[UsrMlcon\Pointer].DBD46
-	UsrMilcon\OSState	DWord	HMI_Connectio	AS_RED01	<multiplex tag=""></multiplex>	%DB[UsrMlcon\Pointer].DBD30
-	UsrMilcon\PanelPerm_PCS7	DWord	HMI_Connectio	AS_RED01	<multiplex tag=""></multiplex>	%DB[UsrMlcon\Pointer].DBD50
-	UsrMlcon\Permission_PCS7	DWord	HMI_Connectio	AS_RED01	and the second sec	ter].DBD8
-	UsrMlcon\Pointer	Int	HMI_Connectio	AS_RED01	PANEL_DB.DB_P_USRM	%DB25.DBW8
	<add new=""></add>				\cap	
			\bigcirc		(4)	
			(3)		$\mathbf{\circ}$	
			-			

- 6. Open a new or existing process image.
- Drag the blocks "UsrM" (5) and "PCS7_UsrM_Icon" (5) into the process screen. The previously created tags will be automatically linked to these picture objects.

 		· · · · · · · · · · · · · · · · · · ·		
 PCS 7 Industry Library	0000000000000000			
00000000000000000000000000000000000000	■ 2			
000000000000000000000000000000000000000	000000000000000000000000000000000000000	· · · · · · · · · · · · · · · · · · ·		
000000000000000000000000000000000000000	000000000000000000000000000000000000000			
 000000000000000000000000000000000000000	000000000000,00 00000		UsrM	
000000000000000000000000000000000000000	000000000000000000000000000000000000000	•		
			••••••	
			Libraries	7 M V
		^		
 Bedienebene Lo	okaleOS		Options	
 			🗲 Library view 🙆	
 Ausführung	OK Abbrechen		_	
Ausführung	OK Abbrechen		 ✓ Project library 	
Ausführung	OK Abbrechen		✓ Project library ✓	-
Ausführung	OK Abbrechen		✓ Project library ✓ All ✓ All ✓ Mot	•
Ausführung	OK Abbrechen		✓ Project library ✓ All ✓ All ✓ Mot ✓ MotRev	•
Ausführung	OK Abbrechen		✓ Project library All Mot MotRev MotSpd	*
Ausführung	OK Abbrechen		Project library Image: All Imag	<u>+</u>
Ausführung	OK Abbrechen		 ✓ Project library ▲ All ▲ Mot ▲ MotRev ▲ MotSpd ▲ MotSpdC ▲ OpA 	<u>∎</u>
Ausführung	OK Abbrechen		 ✓ Project library ➢ All ➢ Mot ➢ MotSpd ➢ MotSpdC ➢ OpA ➢ OpD ➢ DopD 	-
Ausführung	OK Abbrechen		 ✓ Project library ▲ All ▲ Mot ▲ MotRev ▲ MotSpd ▲ MotSpdC ▲ OpD ▲ PID ➡ PID 	<u>-</u>
Ausführung	OK Abbrechen		 ✓ Project library ▲ All ▲ Mot ▲ MotRev ▲ MotSpd ▲ MotSpdC ▲ OpD ▲ OpD ▲ PlD ▲ UsrM 	∄ _^
Ausführung	OK Abbrechen		 ✓ Project library ▲ All ▲ Mot ▲ MotRev ▲ MotSpd ▲ MotSpdC ▲ OpD ▲ PID ♥ UsrM 50 ♥ CS7_UsrM_Icon ♥ UsrM 	<u></u>
Ausführung	OK Abbrechen		 ✓ Project library ▲ All ▲ Mot ▲ MotSpd ▲ MotSpdC ▲ OpD ► OpD ► PID ► UsrM ► UsrM ▲ UsrM_Faceplate 	¥ ^
Ausführung	OK Abbrechen		 ✓ Project library ▲ All ▲ Mot ▲ MotRev ▲ MotSpd ▲ MotSpdC ▲ OpD ▲ OpD ▲ OpD ▲ PID ♥ IUsrM UsrM UsrM_Faceplate ▲ UsrM_Icon 	₽
Ausführung	OK Abbrechen		 ✓ Project library ▲ All ▲ Mot ▲ MotRev ▲ MotSpd ▲ MotSpdC ▲ OpD ▲ OpD ▲ PID ♥ IUsrM ⑤ PCS7_UsrM_Icon ⑤ UsrM_Faceplate ④ UsrM_Icon ▲ VIv 	₽

Figure 5-6

- 8. Adjust the input levels as described in the section "<u>Adjusting the texts for the input levels</u>".
- 9. Compile and load the panel.
- 10. The operator authorizations can now be controlled via the panel.

6 Operation at execution time

6.1 Setting the authorized input level during runtime

During runtime, you can select the input level at the OS, or control it via the process at the "KeySwLvl" input of the "UsrM" block.

Specifying the authorized level via the process

The level which is to receive control command acceptance is defined using the "KeySwLvl" input. The input is of type "INT" and processes the values 1 to 8. The default input level using the process becomes active when the "Keyswitch" input is set.





- (1) Selectable input level
- (2) Non-selectable input level
- (3) Operation mode: KeySwitch = FALSE (OS), KeySwitch = TRUE (process)
- (4) Specification of the input level using the process
- (5) Maximum usable input levels
- (6) Selected input level
- (7) Display of KeySwitch = TRUE on the OS the block is not operational

The block has the following behavior:

- Only selectable levels can be set.
- If a non-selectable level is set at the "KeySwLvl" input, the next highest level is used.
- If the value at "KeySwLvl" is greater than "MaxLevel" or smaller than 1, the highest selectable level is used.

Specifying the authorized level on the OS by the operator

In the case of operator input at the OS with user administration activated, the logged-in user must have "Higher process controlling" rights.

The faceplate of "UsrM" is only operational if the value '0' is present at the "KeySwitch" input of the AS block.

Figure 6-2				
ority/OperatingLevel	Authority/OperatingLe	vel		×
ControlRoom	User Management	×	<mark>^</mark> 🔁 🔁 🐳	·····································
		Operation Level	ControlRoom	
			LocalOS	
			Panel1	
		3	Panel2	
\sim		7		
(2)				4
rity/P Mo or				
Authority/Motor				
M H	Operation Level	Danald		
<u> </u>		Paner		
	Execution	OK	Cance	el

- (1) Display of the active level on the "UsrM" block icon
- (2) Display of the active level on the block icon for the panel interface block on the OS
- (3) Selectable level
- (4) Selection button for changing the input level

The levels that can be displayed and selected are only the ones set as active on the block (inputs "Dev01Act" to "Dev08Act").

The texts on the block icon and on the faceplate are defined using the "IL_OpLong" enumeration.

6.2 Operation on the OS and on the Operator Panel

Depending on the configuration effort, the process screen will have a similar appearance for both operating stations (Operator Station and Comfort Panel).



The following special features will result from operating the system using the Industry Library blocks:

- The station authorized for operation can be set at the OS (1), depending on the configuration, on a panel or via the process.
- Pending alarms and messages and the input level (2) set are displayed on the OS block icon of the interface block.
- The symbol "OP" on the panel block icon indicates whether this block is currently operational (3).

7 Appendix

7.1 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: https://support.industry.siemens.com/

Technical Support

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

https://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: https://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:

https://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:

https://support.industry.siemens.com/cs/ww/en/sc/2067

7.2 Links and literature

Table 7-1

No.	Торіс
\1\	Siemens Industry Online Support https://support.industry.siemens.com
\2\	Link to this entry page of this application example https://support.industry.siemens.com/cs/ww/en/view/50708061

7.3 Change documentation

Table 7-2

Version	Date	Modifications
V1.0	01/2019	First version