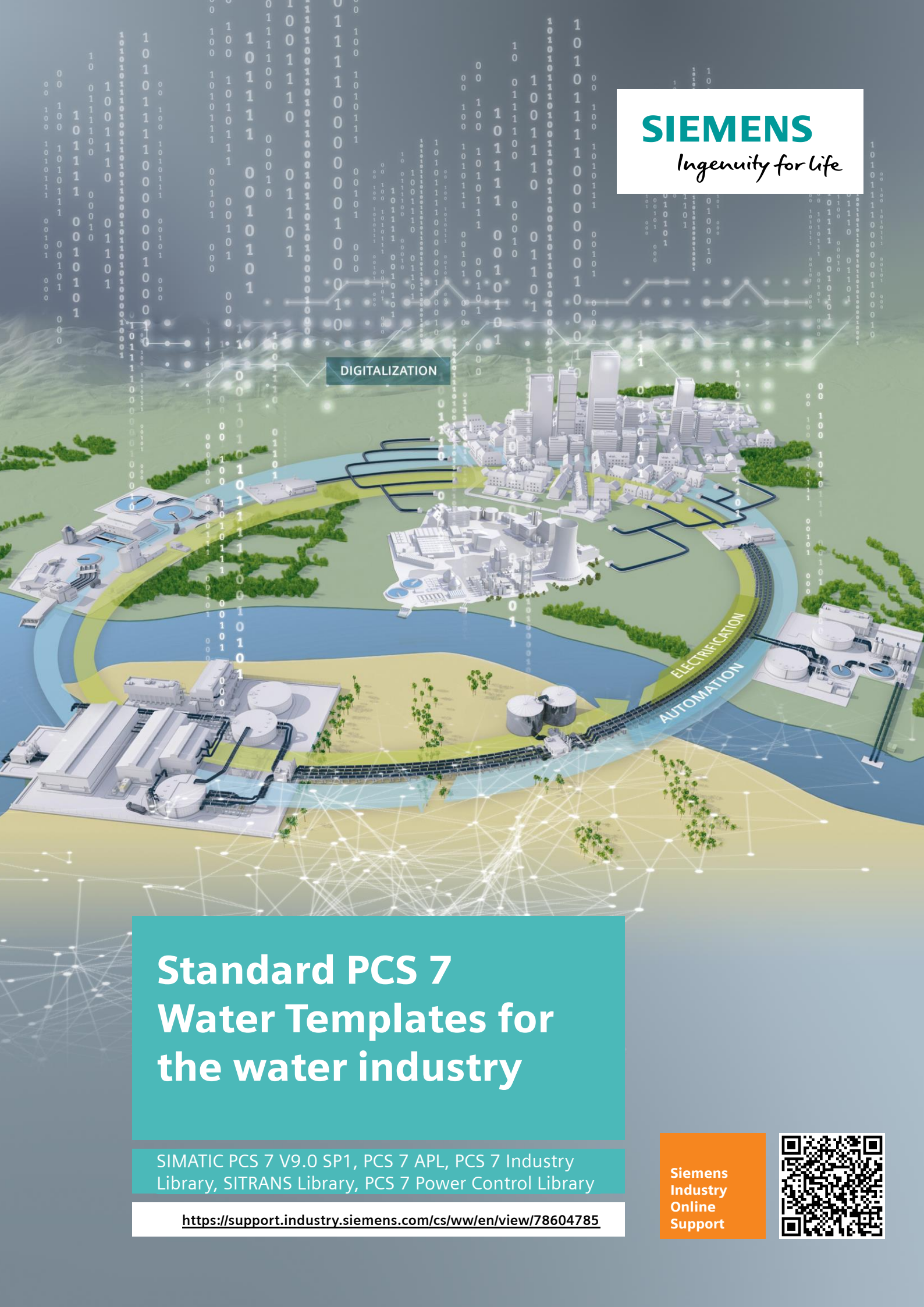


The background of the entire page is a stylized illustration. It features a city skyline with various buildings, including a prominent cooling tower. The city is situated on a riverbank. A large, winding river flows through the scene. In the foreground, there are industrial facilities, including large storage tanks and processing units. The entire scene is overlaid with a network of white lines and dots, representing a digital or data network. Binary code (0s and 1s) is scattered throughout the background, particularly in the upper half. The Siemens logo and tagline are in the top right corner.

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DIGITALIZATION

ELECTRIFICATION
AUTOMATION

Standard PCS 7 Water Templates for the water industry

SIMATIC PCS 7 V9.0 SP1, PCS 7 APL, PCS 7 Industry
Library, SITRANS Library, PCS 7 Power Control Library

<https://support.industry.siemens.com/cs/ww/en/view/78604785>

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1 Overview of the PCS 7 Water Templates

1.1 Use

The use of standard PCS 7 Water Templates focuses on the focal points of the water industry with municipal or private plant operators for:

- Drinking water
- Wastewater
- Desalination
- Water transport (pipelines, water distribution)

These standardized PCS 7 Water Templates can also be used in the following areas:

- Irrigation
- Pumping stations
- Wastewater services
- Industrial water
- Water purification
- Dams
- Weirs
- Waterways/locks
- Dyke systems/flood protection
- Other branches

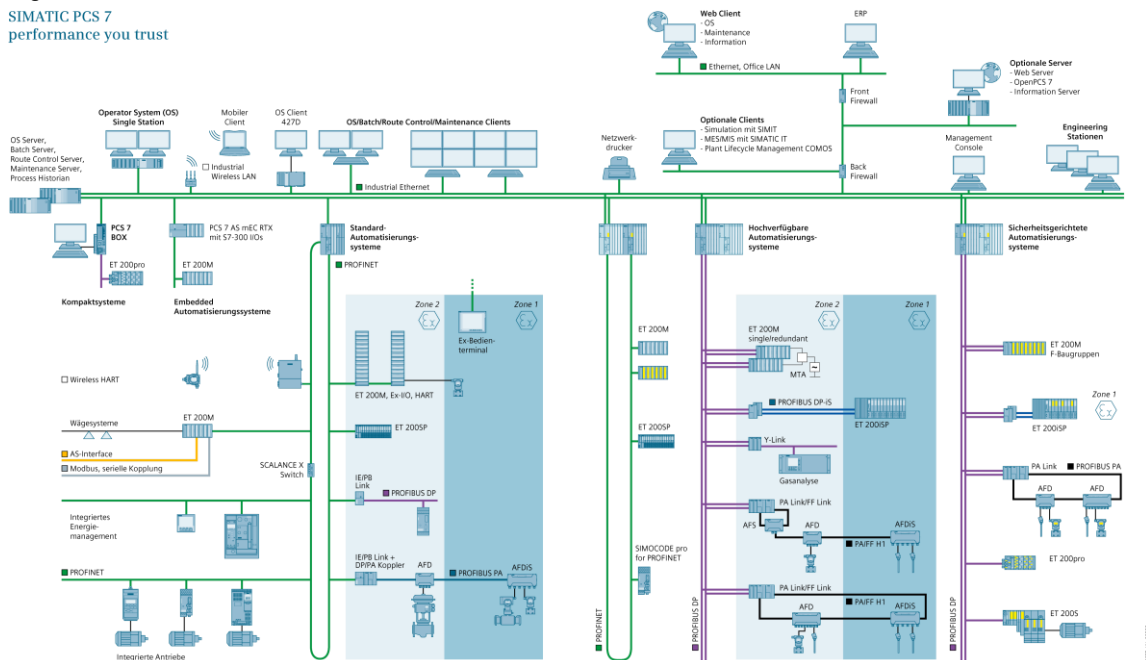
1.2 Requirements

The water industry is closely connected to our environment. In addition to process engineering, it also sets technical, economic and environmental requirements.

Cost reduction in planning, engineering, maintenance and repair times, as well as employee training are just as much a part of this as the total costs of all investments incurred over the entire life cycle (Total Cost of Ownership = TCO).

The technical requirements focus on scalable solutions with SIMATIC S7-300/S7-400 hardware, tailor-made from the smallest plant to complex large-scale plants. High availability must be guaranteed at all times at all levels (plant management, operation and monitoring, automation, field and process levels). This also includes the problem-free integration of process instrumentation, power distribution, drive solutions such as engines, gate valves, valves and frequency inverters.

Fig. 1-1
SIMATIC PCS 7
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In particular, the connection of decentralized structures such as pumping stations, sewer networks, water reservoirs and storage channels via telecontrol is another important aspect within the framework of the technical requirements in the water industry.

1.3 System requirement

The PCS7 Water Templates are based on the following, partly licensed components:

- SIMATIC PCS 7 Advanced Process Library (APL)
- SIMATIC PCS 7 Add-On Industry Library (IL)
- SIMATIC PCS 7 Add-On Power Control APL Library (PC)
- SITRANS Library (SL) – free
- SITOP Library - free

The use in your configuration environment or in process operation obliges you to purchase the engineering and runtime licenses for the Industry Library, possibly also for the Add-On Power Control, provided that these components and functions are used.

The SITRANS Library and the SITOP Library are available free of charge in the Online Support.

The commissioning of SIMOCODE pro V or SINAMICS devices requires the SIMOCODE ES engineering license or the STARTER license.

The following table contains the links to the order information or the free downloads of the used products:

Tabelle 1-1

Produkt	Link
PCS 7 Industry Library (IL)	https://support.industry.siemens.com/cs/ww/en/view/109750720
PCS 7 Power Control (PC)	https://support.industry.siemens.com/cs/ww/en/view/109759919
PCS 7 SITRANS Library (SL)	https://support.industry.siemens.com/cs/ww/en/view/65741624 free of charge
PCS 7 SITOP Library	https://support.industry.siemens.com/cs/ww/en/view/109476154 free of charge
SIMOCODE ES	https://support.industry.siemens.com/cs/ww/en/view/28368485
STARTER	https://support.industry.siemens.com/cs/ww/en/view/109757244

1.4 Concept structure

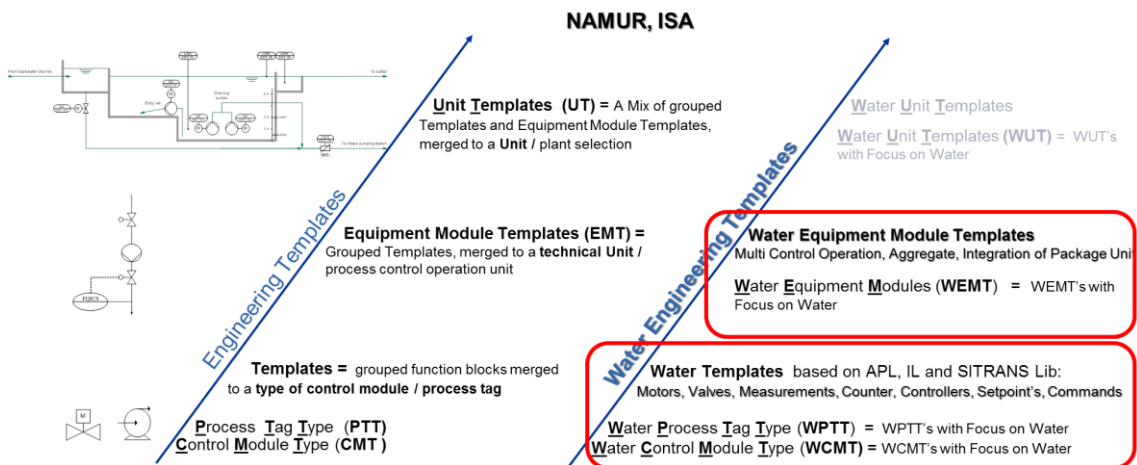
1.4.1 Standardized engineering templates in process control

The use of standardized engineering templates increases the economic benefit in project engineering, for example:

- Cost reduction in application development and basic engineering
- Standardization through unified program structures
- Secure operator control and monitoring with uniform look and feel
- Life cycle guarantee with short maintenance and servicing times

Engineering Templates are based on the physical model of the standards NAMUR NE33 and ISA S88.01 (ANSI/ISA-88.01-1995) and designed as follows:

Figure 1-2



Templates

Templates consist of clustered function blocks typified as:

- Process Tag Type (PTT)
- Control Module Type (CMT)

and contain:

- Input/output signals
- Technological functions (e.g. engine)
- Panel and local controls
- Monitoring functions and recording of operating hours.

Equipment module templates

Equipment Module Templates consist of clustered templates of various types, which are grouped into a technical device / process control operation unit, e.g. multi-user control, 8/16 aggregate switching, package units, dosing control.

Unit Templates

Unit Templates consist of templates and Equipment Module Templates with hierarchical structures, which are connected to a *plant section* (e.g. storage channel).

Process Cell, Area, Site, Enterprise

Further components of the physical model taken from ISA -88.01, such as Process Cell (higher-level plant unit), Area (production plant), site (plant) and Enterprise (company) are not considered any more in this document.

1.4.2 Water Engineering Templates in the water industry

In the water industry, Engineering Templates are ideally used with water-specific functionalities and industry-specific properties. These Water Engineering Templates (WET) consist of three groups:

Water Templates

Table 1-2

Abbreviation	Explanation of term
WPTT	<u>W</u> ater <u>P</u> rocess <u>T</u> ag <u>T</u> ype water-specific process tag type
WCMT	<u>W</u> ater <u>C</u> ontrol <u>M</u> odule <u>T</u> ype A water-specific control module type

Water Equipment Modules

Table 1-3

Abbreviation	Explanation of term
WEMT	<u>W</u> ater <u>E</u> quipment <u>M</u> odule <u>T</u> ype Water-specific devices / process control operation unit

Water Unit Template (WUT)

Table 1-4

Abbreviation	Explanation of term
WUT	<u>W</u> ater <u>U</u> nit <u>T</u> ype A water-specific plant unit

NOTE

This document describes primarily the design and use of PCS 7 Water Types. In the following descriptions, the term "PCS 7 Water Template(s)" is primarily used.

1.4.3 Definition of "water-specific"

The term "water-specific" takes into account the legal requirements and guidelines for water or wastewater treatment plant operators, which have to be adhered to in the construction, operation, maintenance and care.

The most important water-specific requirement is to ensure plant operation in case of partial/complete failure of the process control, remote control and/or automation technology.

Standardized solutions are available in the PCS 7 Water Templates with CPU 410/400 hardware for this and other requirements:

- Simple multi-user control 1 out of 8 control locations
- Integrated Panel operation (optional mosaic panel connection)
- Integrated local controls (HW) **without** automation (AS)
- Integrated local controls (SW) **with** automation
- Unit switchover for 8/16 drives
- 96 turning points with 15 minutes setpoint curve specifications
- Programmable and controllable polygon with 8 turning points
- Monitoring of measured values with up to 8 limit values
- Time-driven controller for simple process operations
- Simple Integration of Package Unit solutions with S7-300/IM151-8 in the PLT
- Exemplary drive solutions for AUMA © actuators via PROFIBUS connection.
- Complete drive solutions (pumps, agitators, etc.) via PROFIBUS DP/PROFINET connection with SIMOCODE pro V (incl. hardware engineering)
- Complete drive solutions (dosing pumps, blowers, etc.) with SINAMICS G120 with or without field bus connection (incl. hardware engineering)
- Integrated solution with SITRANS F, SITRANS L SITRANS P und SITRANS T process instrumentation with or without field bus connection (PROFIBUS DP/PA).
- Integrated solution for SITOP 24V DC with or without field bus connection (PROFINET).
- Integrated power engineering solutions for low voltage (NSHV) and medium voltage (MSHV) according to IEC 61850 with or without PROFIBUS / PROFINET connection.

1.4.4 Water-specific process tag types

A water-specific process tag type (WPTT) is a template of project-specific interconnections of CFC blocks. It is based on the PCS 7 APL and the PCS 7 IL. In addition, a WPTT can contain function blocks of the SITRANS Library, the SITOP Library and the Power Control APL Library.

The process tag types can be edited in PCS 7 with the PCS 7 Plant Automation Accelerator/COMOS.

Note

From SIMATIC PCS 7 V8.2 onwards, the WPTTs are omitted, to be fully replaced by WCMT.

1.4.5 Water-specific control module types

The control module types (WCMT) are flexible process tag types with special advantages of the variant creation, the connection of Sub Control Modules, the synchronization of types and the mass data engineering with COMOS or PCS 7 Plant Automation Accelerator (PAA)

- Instance-specific changes to the instance of the control module are not lost during synchronization between type and instance.
- It is also possible to create different instances from a single control module type. In addition to this, optional blocks are also configured in WCMT. Before creating the instances, it is possible to determine in COMOS/PCS 7 Plant Automation Accelerator whether or not to activate the optional blocks in the corresponding instance. For this purpose, the additional view "Technological Connections" has been introduced in the CFC Editor as of PCS 7 V8.0 SP2 Upd 9.

It is stored as a central technological object in a PCS 7 master data library and consists of:

- a CFC chart
- a PCS 7 OS block icon
- PCS 7 APL faceplates.

The WCMT are preset to the essential water-specific functions and can always be adjusted by the user to the required operational conditions in the master data library. In doing so, the water templates do not lose their standardization character.

1.4.6 Water-specific Equipment Module Types

Water Specific Equipment Modules Types (WEMT) are available for technical units which can be composed of controls, valves, sensors, devices/actuators and/or mechanical components. The individual WEMT are grouped from various PCS 7 Water Templates (WCMT) or consist of separate control system operation units. The WEMT for control operations (For example, multi-waiting selection, aggregate switching, package unit connection) are stored as CFC plans. Controls, such as the split range control, are created in the form of a sample solution.

WEMT store data in a PCS 7 master data library, consisting of:

- a CFC chart
- a PCS 7 OS block icon
- PCS 7 APL faceplates.

Processing via mass data engineering can also be done with COMOS/PCS 7 Plant Automation Accelerator.

All PCS 7 Water Templates can only be used in conjunction with the standard PCS 7 hardware components. We recommend a combination of efficient mass data engineering with the PCS 7 Water Templates in COMOS/PCS 7 Automation Base ("Integrated Engineering").

1.4.7 Water-specific Unit Template (WUT)

Water-specific unit templates are available for technical subsystems on the basis of standardization. They are made up of the APL standard libraries, Industry Library and SITRANS Library, WCMT as well as WEMT.

In the online support you will find the following prepared unit templates of the water industry:

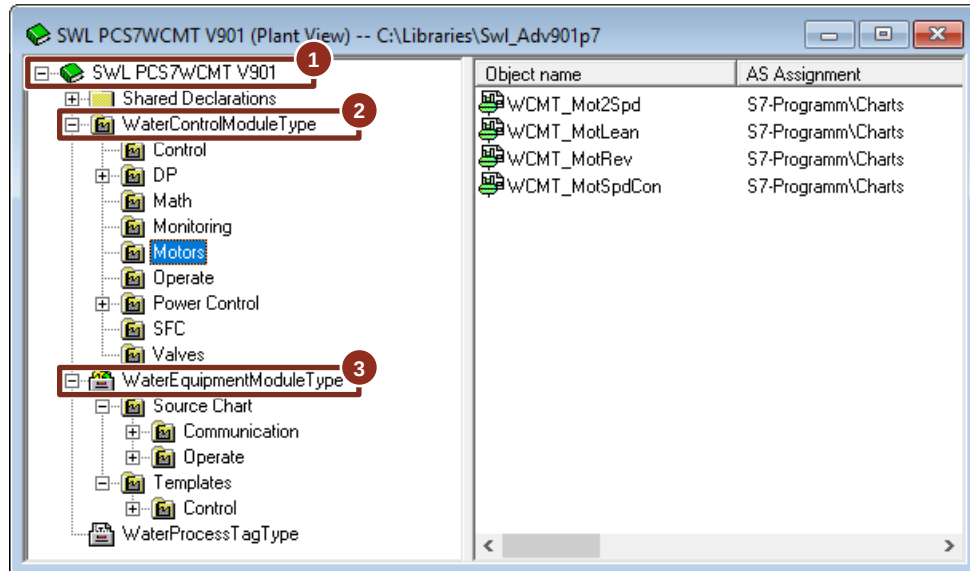
Tabelle 1-5

Nr	PCS 7 Water Unit Template
/1/	Control of Biological Stage of a Wastewater Treatment Plant with Upstream Denitrification: https://support.industry.siemens.com/cs/ww/en/view/109478073
/2/	Control of Biological Stage of a Wastewater Treatment Plant with Intermittent Operation: https://support.industry.siemens.com/cs/ww/en/view/109485916
/3/	External Pump Station of a Wastewater Treatment Plant (WWTP): https://support.industry.siemens.com/cs/ww/en/view/109481486
/4/	Efficient Management of Storm Water Tank: https://support.industry.siemens.com/cs/ww/en/view/109481487

1.4.8 Structure of the PCS 7 Water Templates

The PCS 7 Water Templates are summarized in the PCS 7 library "SWL PCS7WCMT V901". In the plant view, the water-specific CMTs are structured hierarchically as follows:

Figure 1-3



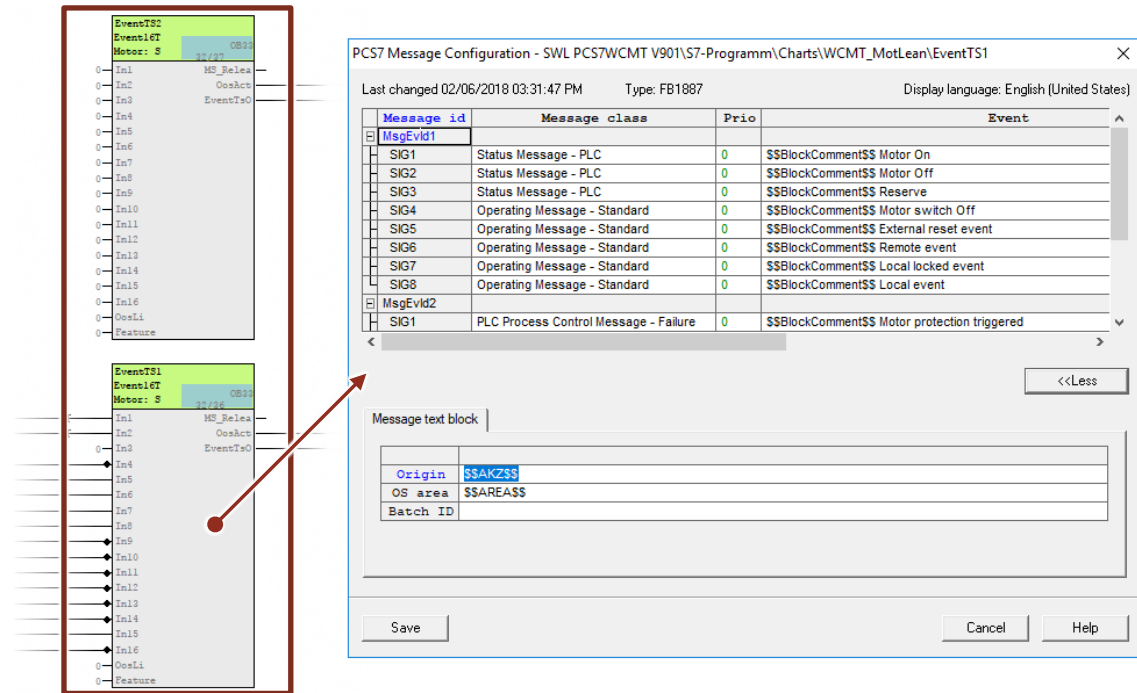
- (1) Library
- (2) Water-specific control module types (WCMT)
- (3) Water-specific devices (WEMT)

The classification of the PCS 7 Water Templates is based on the standardized PCS 7 library structures.

1.4.9 Messaging in Water Templates

A unified message process with predefined message texts has been implemented in the Water Templates

Figure 1-4



Engine controls

The following messaging is valid for the MotLean, MotRev, Mot2Spd, MotSpdC templates:

Table 1-6

Bit	EventTS1	Message class	Prio- rity	Info text	Acknowledg ment
1	Engine on (right)	Status message - AS ¹	0		○
2	Engine off	Status message - AS ¹	0		○
3	Engine on (left)	Status message - AS ¹	0		○
4	Repair switch off	Status message - AS ¹	0		○
5	External reset	Status message - AS ¹	0		○
6	Operating mode preselection: remote	General operation message	0		○
7	Operating mode preselection Off/Zero/Blocked	General operation message	0		○
8	Operating mode preselection: local	General operation message	0		○
9	Engine protection triggered	AS process control system alarm message	0		●
10	Control fuse triggered	AS process control system alarm message	0		●
11	Temperature rise / thermistor protection triggered	AS process control system alarm message	0		●
12	Mechanical protection	AS process control system alarm message	0		●
13	Dry-run protection triggered	AS process control system alarm message	0		●
14	Differential pressure/membrane monitoring triggered	AS process control system alarm message	0		○
15	Bypass active	AS process control system alarm message	0		○
16	Emergency stop/Stop	AS process control system alarm message	0		○

○ without message acknowledgement

● with message acknowledgement

Message block "EventTS2" enables an optional plant-oriented expansion of the possible messages. Inputs 1-8 are for operation messages that do not need to be acknowledged, while inputs 9-16 are for alarm messages that do have to be acknowledged. Message block "EventTS2" deactivated by default, in order to save CPU storage space and process objects.

Slide/flap/valve controls

The following messaging is valid for the VlvL, VlvMotL, VlvAnalog, VlvPosL templates:

Table 1-7

Bit	EventTS1	Message class	Prio- rity	Info text	Acknowledg ment
1	Slider/flap/valve open	Status message - AS ¹	0		○
2	Slider/flap/valve Stop	Status message - AS ¹ oben	0		○
3	Slider/flap/valve closed	Status message - AS ¹	0		○
4	Repair switch off	Status message - AS ¹	0		○
5	External reset	Status message - AS ¹	0		○
6	Operating mode preselection: remote	General operation message	0		○
7	Operating mode preselection Off/Zero/Blocked	General operation message	0		○
8	Operating mode preselection: local	General operation message	0		○
9	Engine protection triggered	AS process control system alarm message	0		●
10	Control fuse triggered	AS process control system alarm message	0		●
11	Temperature rise / thermistor protection triggered	AS process control system alarm message	0		●
12	Torque open triggered	AS process control system alarm message	0		○
13	Torque closed triggered	AS process control system alarm message	0		○
14	Differential pressure/membrane monitoring triggered	AS process control system alarm message	0		○
15	Bypass active	AS process control system alarm message	0		○
16	Emergency stop/Stop	AS process control system alarm message	0		○

○ without message acknowledgement

● with message acknowledgement

¹ As of SIMATIC PCS 7 V8.2, the message class "Status message AS" must be set for all operating messages and the message class "General operating message" must be set for all local operations. This message classes only supports the signal change 0-> 1 (incoming). Signal change 1-> 0 (outgoing) is not recognized and supported. To ensure that the messages "engine off" or "slide stop" are archived correctly, these signals must also be interconnected at EventTS. With this message variant, all system states from the archive (only by activated Long Term Archiving) can be filtered swiftly and unambiguously and visualized.

1.5 Complete overview

The following example describes the structural design and the standardized content of the PCS 7 Water Templates.

In order to work with the templates, the user should have practical experience in the PCS 7 Engineering environment and possess procedural knowledge of the water industry.

All PCS 7 Water templates are limited to the essential functional content and their water-specific applications.

Additional information can be found in the following README files:

Table 1-8

No.	Link
/1/	SIMATIC PCS 7 V9.0 SP1 https://support.industry.siemens.com/cs/ww/en/view/109750097
/2/	PCS 7 Advanced Process Library (APL) V9.0 SP1 https://support.industry.siemens.com/cs/ww/en/view/109757947
/3/	PCS 7 Industry Library (IL) V9.0 https://support.industry.siemens.com/cs/ww/en/view/109756107
/4/	SITRANS Library (SL) V8.0 https://support.industry.siemens.com/cs/ww/en/view/109755967
/5/	SITOP Library V3.1 for PCS 7 https://support.industry.siemens.com/cs/ww/en/view/109476154

The separate engineering tool TIA portal V14 SP1 Upd4 is used for the integration of the IPC/Comfort Panel. The licensed software packages SIMOCODE ES 2007 + SP7 or STARTER V4.4.0.0 are required for engineering with SIMOCODE pro V or SINAMICS G120, depending on the application.

Note

A complete overview of the installed software can be found in the section:
[5.1 Installed software](#)

Also available are S7- Water Templates for use in PCS 7 from the CPU 31x(C)-2PN/DP and/or IM151-8(F) hardware.

Note

For further information about the integration of S7-300 with the Industry Library (with and without Remote Control) in PCS 7, refer to the following article:
<https://support.industry.siemens.com/cs/ww/en/view/73133562>

1.5.1 Definition of names and terms

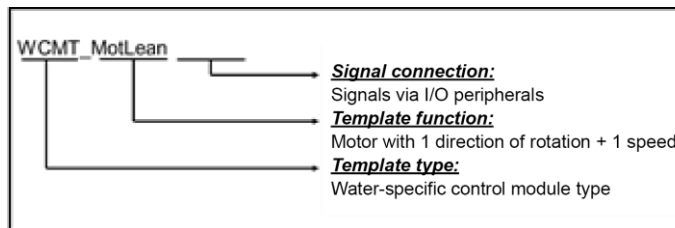
The PCS 7 Water Templates for WCMTs, WEMTs and WUTs and contain uniform name and term definitions to enable quick assignment of tasks and recognition of functions.

They are composed of three criteria:

1. Template type (WCMT, WPTT, WEMT)
2. Template function (name = technology block name from APL, IL or SITRANS Library)
3. Signal connection (without text /_Fb /_FbMMS /_FbDrv)

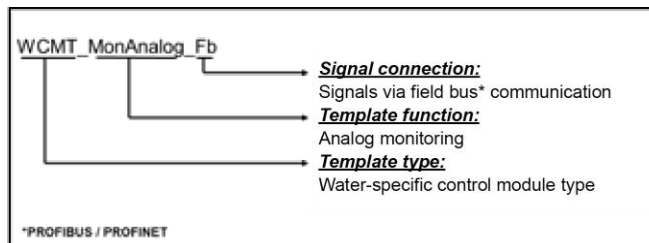
Templates that contain no text for the signal connection, represent all CFCs with analog/digital input/output drivers!

Figure 1-5: WCMT drive with 1 direction of rotation and 1 Speed



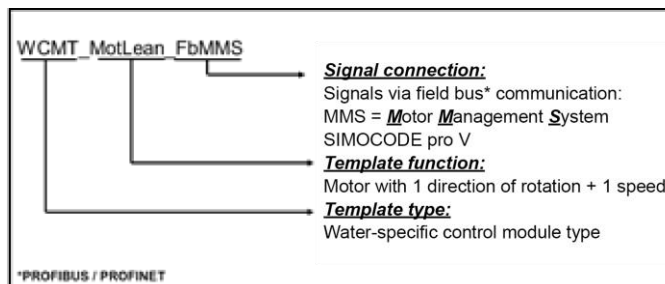
Templates whose signal connections contain "Fb" mark CFC plans with fieldbus drivers for PROFIBUS DP.

Figure 1-6: WCMT analog monitoring with field bus connection



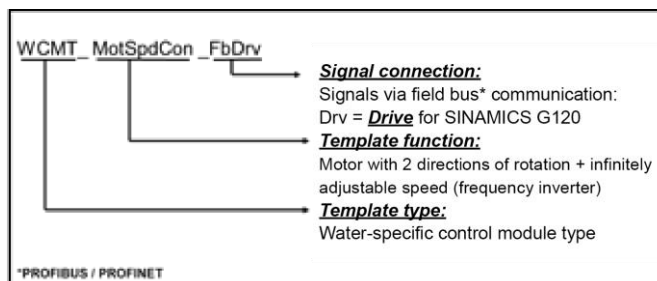
Templates that contain the signal connection "FbMMS" mark CFC plans for SIMOCODE pro V with fieldbus drivers for PROFIBUS DP.

Figure 1-7: WCMT SIMOCODE 1 direction of rotation-1 speed and field bus



Templates that contain the signal connection "FbDrv" mark CFC plans for SINAMICS G120 with fieldbus drivers for PROFIBUS DP.

Figure 1-8: WCMT SINAMICS FI with 2 directions of rotation and field bus connection



1.5.2 Overview of PCS 7 WCMTs

The library contains 44 PCS 7 Water Templates of the type "single control module type". The following table shows all templates in alphabetical order:

Table 1-9

Name	Function
WCMT_AccuS	Formation of a weighted accumulated value, which can consist either of a count value or a constantly measured value
WCMT_AUMAVx_Fb	Control of AUMA actuators
WCMT_MonAnalog	Analog monitoring for flow, level, temperature, pressure
WCMT_MonAnalog08	Analog monitoring 8 limits for flow, level, temperature, pressure, etc.
WCMT_MonAnalog_FbCFU	Analog monitoring with field bus connection for flow, level, temperature, pressure, etc.
WCMT_MonDigital	Digital monitoring
WCMT_MonDigital08	Digital monitoring with 8 binary inputs
WCMT_Mot2Spd	Engine with two speeds and one direction of rotation
WCMT_Mot2Spd_FbMMS	Engine with two speeds and one direction of rotation with field bus connection to SIMOCODE pro V
WCMT_MotLean	Engine with one speed and one direction of rotation
WCMT_MotLean_FbMMS	SIMOCODE pro V engine with one speed and one direction of rotation with field bus connection
WCMT_MotRev	Engine with one speed and two directions of rotation
WCMT_MotRev_FbMMS	Engine with one speed and two directions of rotation with field bus connection to SIMOCODE pro V
WCMT_MotSpdCon	Engine via frequency inverter with infinitely adjustable speed and two directions of rotation
WCMT_MotSpdCon_FbDrv	Engine via frequency inverter with infinitely adjustable speed and two directions of rotation with field bus connection to SINAMICS G120
WCMT_OpAn	Operation of an analog value via interconnection or faceplate operation

1 Overview of the PCS 7 Water Templates

Name	Function
	(setpoint)
WCMT_OpD	Operation of a digital value via interconnection or faceplate operation (command)
WCMT_OpTrig	Operation of a digital value via interconnection or faceplate operation as a pulse signal (ON button)
WCMT_PAC	Monitoring and acquisition of data from SENTRON PAC devices
WCMT_PC_BusBar	PCS 7 Power Control BusBar
WCMT_PC_Feeder	PCS 7 Power Control Feeder
WCMT_PC_Feeder_2CB	PCS 7 Power Control Feeder 2CB
WCMT_PC_Line	PCS 7 Power Control Line
WCMT_PC_MEAS	PCS 7 Power Control Measuring Point
WCMT_PC_Sync	PCS 7 Power Control Device Synchronization
WCMT_PC_Trafo	PCS 7 Power Control Transformator
WCMT_PIDConL	Continuous PID controller
WCMT_PIDStepConL	PID step controller
WCMT_SITOP24V_Modular	Monitoring of SITOP 24 V power supplies. Redundancy, selectivity, buffering
WCMT_SITOP_PSU8600_1x0	Monitoring of the PSU 8600 power supply system with one output
WCMT_SITOP_PSU8600_4x0	Monitoring of the PSU 8600 power supply system with four outputs
WCMT_SitrHR200_Fb	SITRANS HR200 Level measurement (ultrasonic)
WCMT_SitrLR2xx_Fb	SITRANS LR2xx Level measurement (pulse radar)
WCMT_SitrMAG6000_Fb	SITRANS MAG6000 flow measurement
WCMT_SitrP_Fb	SITRANS P Pressure Transmitter
WCMT_SitrTH_Fb	SITRANS TH Transmitter
WCMT_TimeScheduling	Weekly timer with 8 switching points
WCMT_VlvAnalog	Valve with analog actuating signal
WCMT_VlvLean	Valve with two end positions without intermediate switching
WCMT_VlvLean_FbMMS	Valve with two end positions without intermediate switching with field bus connection to SIMOCODE pro V
WCMT_VlvMotor	Engine slide valve
WCMT_VlvMotor_FbMMS	Engine slide valve with field bus connection to SIMOCODE pro V

Name	Function
WCMT_VlvPos	Motorized slide valve with analogue position monitoring
WCMT_VoteAnL	Mean value generation from up to 8 measured values with plausibility check and establishment of the minimum and maximum valid values

1.5.3 Overview of PCS 7 WEMT

8 Water Equipment Module Templates (WEMT) are available for PCS 7.
The following table gives an overview of the templates in alphabetical order:

Table 1-10

Name	Function
WEMT_Aggr08	Unit switchover for up to 8 drives
WEMT_Aggr16	Unit switchover for up to 16 drives
WEMT_CommRedSingle	The block coordinates telegrams (SEND/REV) between a redundant and non-redundant AS via S7 communication
WEMT_Communication	Connection of package units via PUT and GET communication blocks
WEMT_Polygon	Operable polygon with 8 turning points
WEMT_SPCurve	Setpoint curve block, programmable up to 96 turning points
WEMT_SplitrangeControl	Controls up to four drives or engine valves via a PID controller
WEMT_UsrM	Multi-waiting module over 8 operating levels with one control unit " 1 out of n"

1.5.4 Engineering with Control Module (CM) Technology

With the use of water-specific control module types, in this example WCMT, different types of instances can be created in the project. An instance is a copy of the type and is adjusted to the specific requirements through the activation of optional blocks. Necessary changes, such as the extension by additional message or channel modules, are not carried out at every instance, but centrally at the type (template) in the master data library.

Note

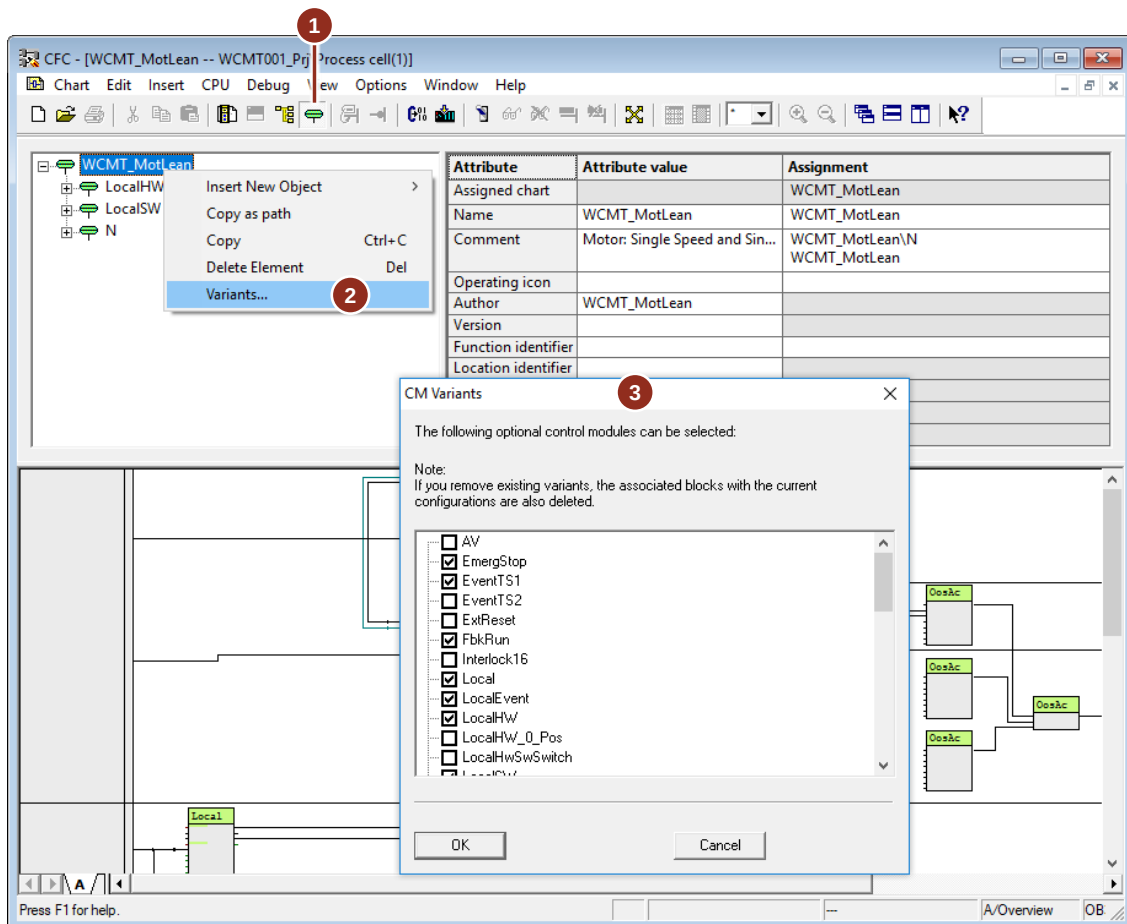
The application example "Control Module (CM) Technology - Efficient Engineering in PCS 7" gives you a general overview of how a CMT is created, extended and instantiated. The application example is available under the following link: <https://support.industry.siemens.com/cs/ww/en/view/109475748>

Selecting a variant

By default, the "Optional" attribute of all the blocks is deactivated in a variant, that is, the required blocks must be connected in a project- and task-specific way. This reduces the memory requirements and the required CPU project objects. A variant and the options necessary for solving the automation task are determined in the instance. For this purpose:

- (1) the technological connections are displayed in the CFC.
- (2) The available variants are displayed in the context menu.
- (3) the functionality required for the automation task is determined by selecting the options.

Figure 1-9

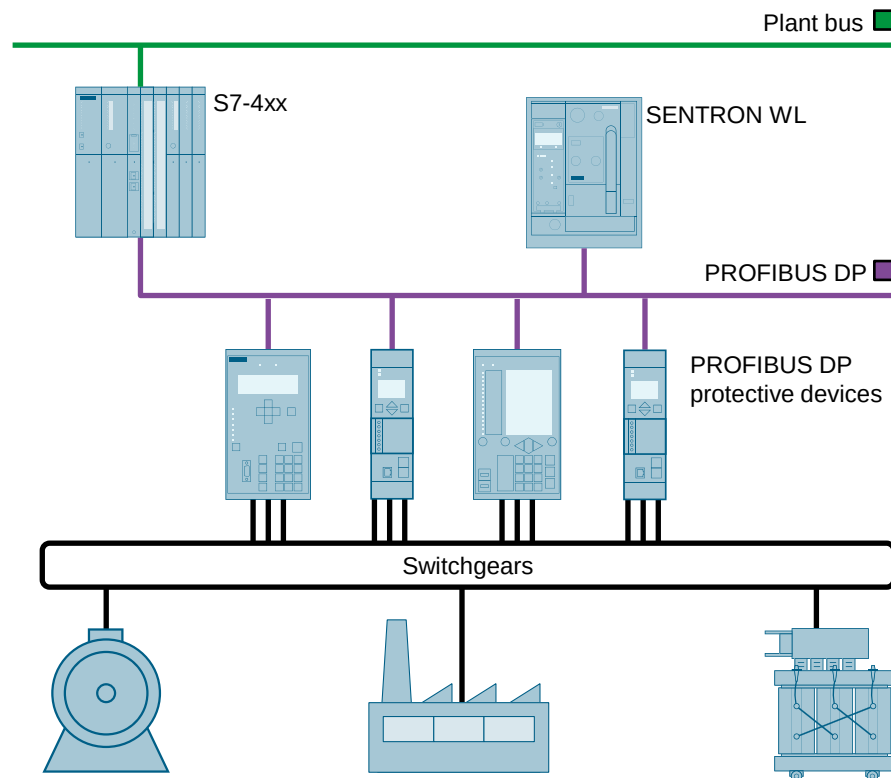


1.6 Solutions for the energy management

With Totally Integrated Power, Siemens offers innovative and interface-optimized products and systems for electrical energy distribution. These are optimally matched to each other and enable easy integration into plants within the water industry. The connection to the automation system is established via communication and software modules.

The Siemens portfolio includes planning tools and matching hardware: from medium voltage switchgear and distribution systems to transformers, switching and protection devices, low voltage busbar systems as well as small distribution boards and sockets. Both maintenance-free medium voltage and low-voltage switchgear as well as their specific busbar interfaces are type-tested.

Abbildung 1-10



The SIVACON S8 switchboard and the 8PS busbar trunking system are used at the low voltage level. The SIVACON systems ensure safe operation with high plant and operator protection. Furthermore, the SIVACON LR busbar trunking system is proven to provide optimal and safe power conveyance in aggressive wastewater atmospheres and has high short-circuit strength and modular outlet boxes. Whenever economical, safe and reliable low-voltage power distribution is required, the SENTRON family offers intelligent circuit breakers, proven load breaker switches or innovative power monitoring devices. SENTRON products come with an extensive range of accessories and are modularly designed for high versatility and flexibility.

SIPROTEC is the standard for the protection, automation and monitoring of your supply system at the medium voltage level.

In the SIPROTEC 4 device families, all the protection, control, measurement and automation functions have been integrated into one device.

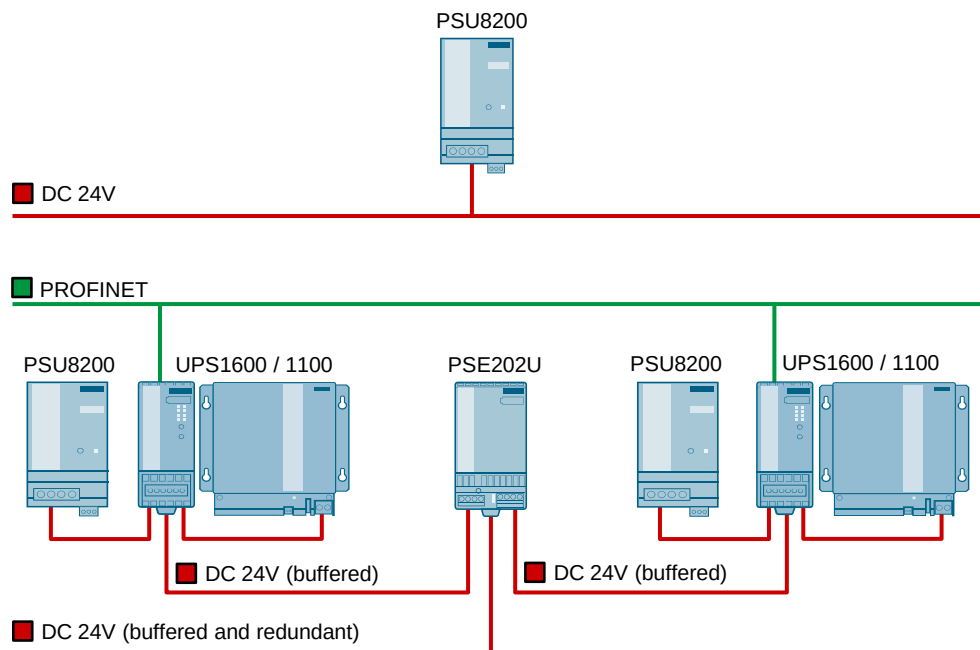
SIPROTEC 4 is the standard for digital protection technology in all areas of application. The connection can be established via PROFIBUS DP.

With the SIPROTEC 5 version, you get access to a new, highly modular and therefore flexible generation of intelligent, digital field devices. SIPROTEC 5 offers a comprehensive product range with modular elements for every application and requirement. The connection can be established via PROFINET.

1.7 Solutions for the 24V power supply

The following schematic figure shows the basic 24V power supply up to the uninterruptible redundant 24V power supply:

Figure 1-11

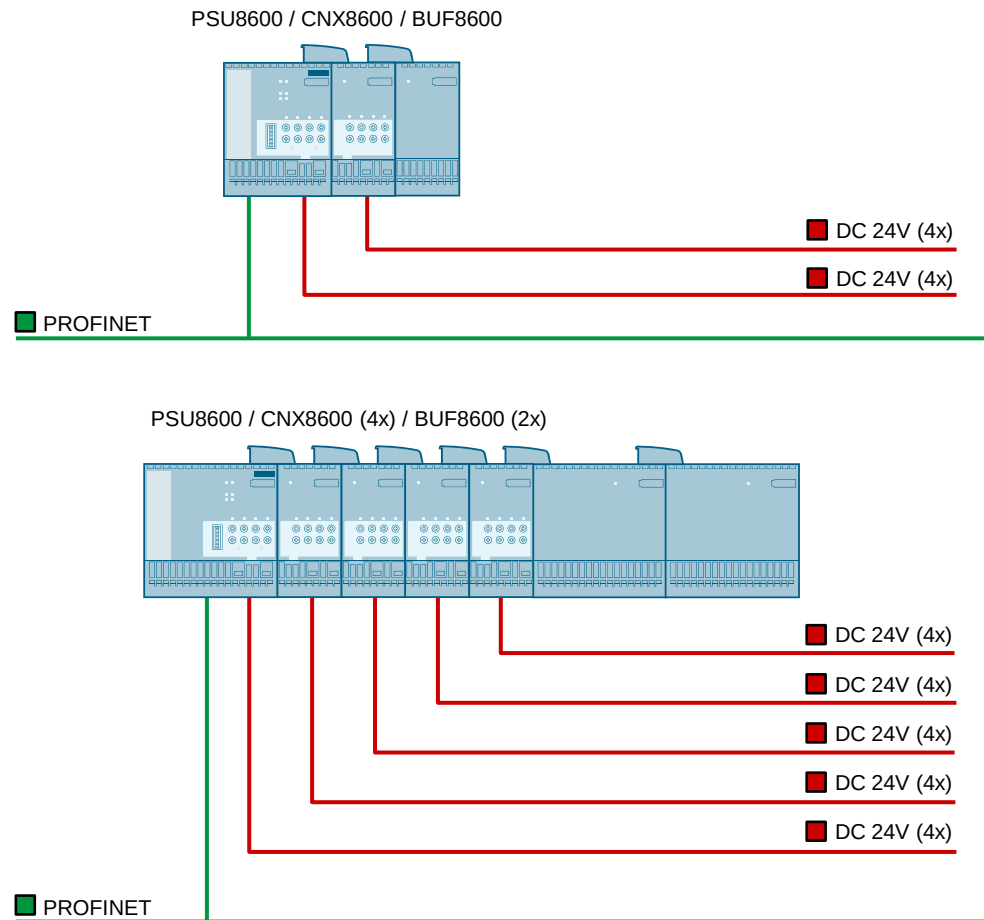


SITOP modular is the power supply series for the lower performance range that has an extremely space-saving, slim design, making it is particularly suitable for integration in distributed applications such as inside switch boxes or in the control cabinet. There is a suitable power supply with optional expansion modules for every application, such as:

- SITOP PSU8200: 1 and 3-phase 24 V power supplies
- SITOP PSE202U: Redundancy module for decoupling SITOP PSU8200
- SITOP PSE200U: Selectivity module for monitoring 24 V feeders
- SITOP UPS1600: Uninterruptible DC power supply (DC-UPS) with signaling contact
- SITOP UPS1600: Uninterruptible DC power supply (DC-UPS) with Ethernet / PROFINET

The following schematic figure shows the SITOP PSU8600 3-phase scalable 24V power supply system with selectivity and buffering:

Abbildung 1-12



SITOP PSU8600 is the power supply system with PROFINET.

- PSU8600: the 3-phase power supply system with 20A or 40A and 1 or 4 selective outputs
- CNX8600: the expansion module with 4 selective outputs
- BUF8600: the buffer module with bridging brief and longer power failures

NOTE

The used faceplates and symbols of the WCMT_SITOP are described in the corresponding profile. The profiles are part of this application example and you can obtain them from your regional sales partner.

In the section entitled [3 WCMT and WEMT profiles](#) you will find the description of a profile using an example.

In the following table you can find links to further informations, application examples and libraries:

Tabelle 1-11

Nr.	Topic
/1/	Integration and simulation of a SITOP 24 V Power Supply in SIMATIC PCS 7 https://support.industry.siemens.com/cs/ww/en/view/109481908
/2/	SITOP UPS1600: Faceplates and Communication Blocks (TIA Portal, STEP 7 and WinCC) https://support.industry.siemens.com/cs/ww/en/view/78817848
/3/	SITOP PSU8600: Faceplates and Communication Blocks (TIA Portal, STEP 7 and WinCC) https://support.industry.siemens.com/cs/ww/en/view/102379345
/4/	All application examples https://support.industry.siemens.com/cs/ww/en/ps/18018/ae

2 Water-specific control module types

The function blocks from the libraries: Advanced Process Library (APL), Industry Library (IL) and SITRANS Library were placed in the WCMT and the WEMT in a CFC subplan A on sheet 1 to sheet 6. This structure represents a clear solution and can always be custom adjusted and changed by the user.

Figure 2-1

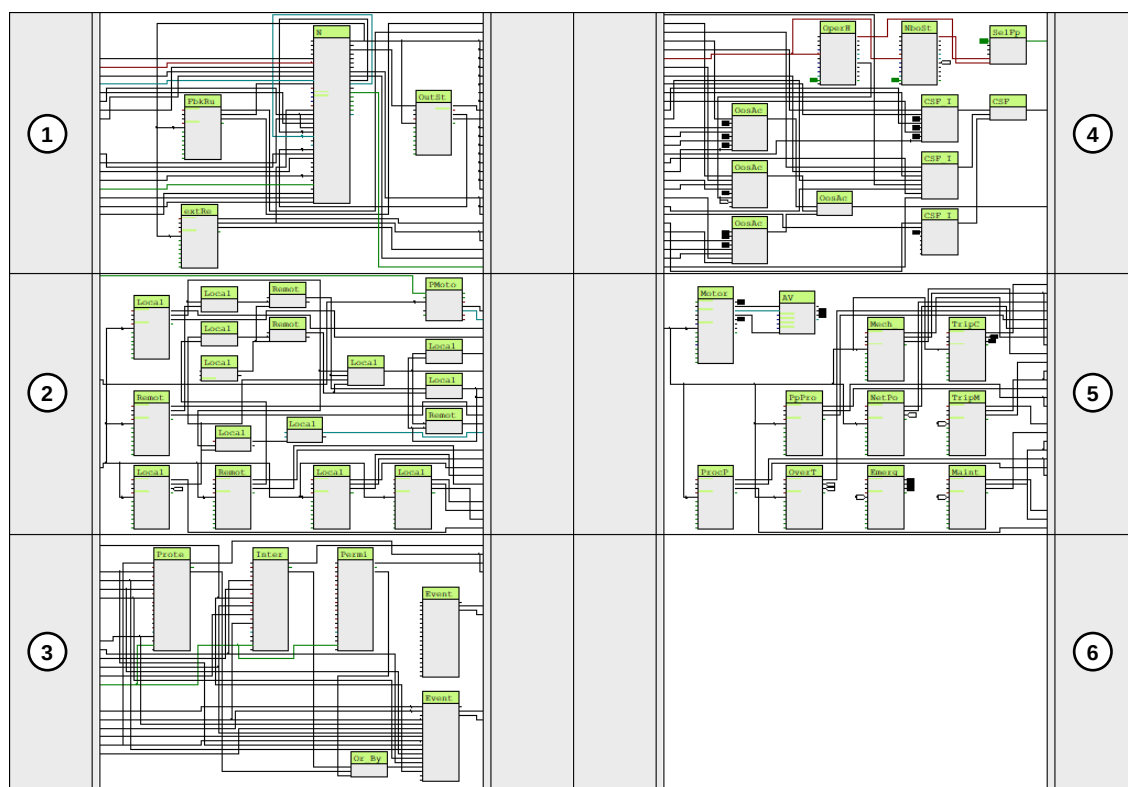


Table 2-1

Subplan A	Function blocks
Sheet 1	Technological block with input/output/field bus drivers or diagnostic monitoring
Sheet 2	Panel operation with prepared shortcut to the UsrM- block (WEMT) and local control selection with/without SPS
Sheet 3	Locking and protection monitoring for Permit, Protect and Interlock as well as EventTS blocks for operation and alarm messages
Sheet 4	Faceplate for jump distributor, recording of operating cycles/hours and maintenance/diagnostics monitoring
Sheet 5	Drive monitoring (engine protection, control fuse, torque monitoring, chain monitoring, belt monitoring, filter monitoring and/or other special functions) and engine current recording with zero point suppression
Sheet 6	Communication (cross data traffic, serial couplings, I slave, etc.)

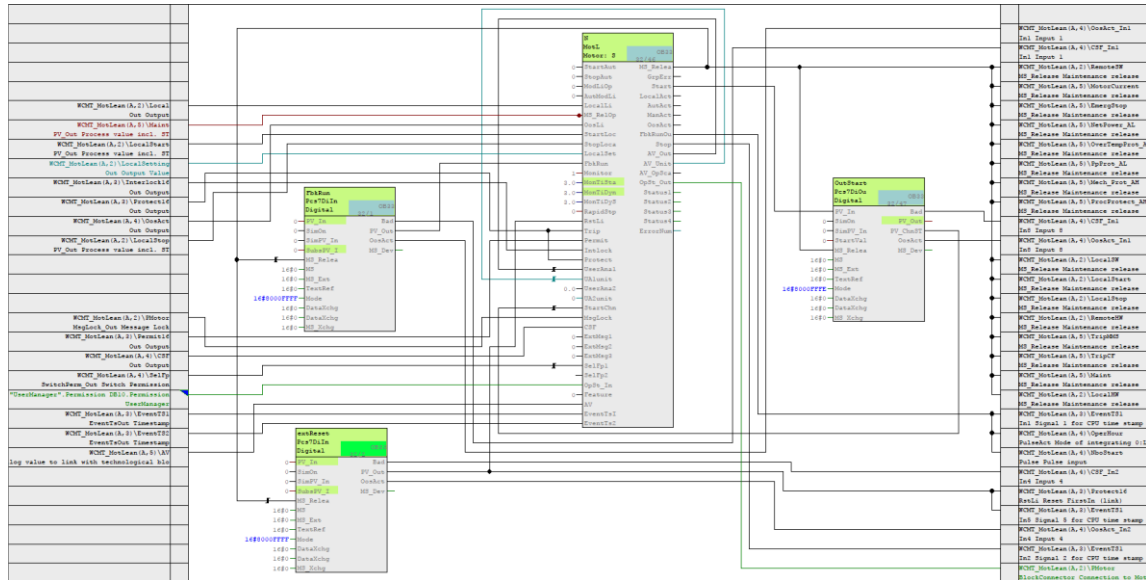
As an example, the following chapters describe four variants of the type WCMT of the PCS 7 Water Templates.

- *WCMT_MotLean*
 - describes the content and functions with analog/digital input/output drivers
- *WCMT_MotLean_FbMMS*
 - describes the contents and functions of SIMOCODE pro V via field bus driver connection to PROFIBUS DP
- *WCMT_MotSpdC_FbDrv*
 - describes contents and functions of SINAMICS G120 via field bus driver connection to PROFIBUS DP
- *WCMT_SitransMAG6000_Fb*
 - describes contents and functions of the MA6000 flowmeter via field bus drive connection to PROFIBUS DP
- *WCMT_SITOP24V_Modular / WCMT_SITOP_PSU8600_1x0/4x0*
 - describes contents and functions of 1-/3-phase DC24V power supply units, power supply redundancy, uninterruptible power supply and selectivity with and without fieldbus connection (PROFINET).
- *WCMT_PC_...*
 - describes the contents and functions of power distribution NSHV and MSHV for rails, circuit breakers, disconnectors, transformers, network synchronization and measured value monitoring with and without field bus connection (PROFIBUS/PROFINET).

2.1 WCMT_MotLean template

2.1.1 CFC subplan A/ sheet 1

Figure 2-2



In subplan A sheet 1, the *WCMT_MotLean* provides a drive function with one direction of rotation and one speed. The technological core functions are implemented by the APL *MotL* block. In subplan A sheet 1, the following signal is connected to *MotL* via the input driver *PCS7DiIn* by default:

- HW: Contact (sheet 1) -> "FbkRun" 1/0 = **Feedback actuator on/off**

The ON/OFF control commands from *MotL* are passed on to the output module via the output driver *PCS7DiOu OutStart*.

Drive operation is prepared for integration with the multi-user concept (MWK) via the *WEMT_UsrM* solution. The implementation takes place on subplan A/sheet 2 of the CFC.

By default, the following controls of different control locations are taken into account in the sample chart *WCMT_MotLean*, which is typically used in the water industry:

- PCS 7 operation via the faceplate (Automatic, Manual, Out of service)
- Button operation via input module with PLC (local software)
- Keyboard operation without PLC incl. follow-up mode on PCS 7 OS (local hardware)
- Panel operation via the faceplate (Automatic, Manual)
- Seamless switchover during change of operating mode from "Local" or "Manual" to "Auto"
- Seamless switchover during change of operating mode from "Auto" to "Local" or "Manual"

In the PCS 7 OS, the "Out of service" mode can be activated from the *MotL* faceplate. The activation is output via the interconnectable output parameters "OosAct_Out =1" of *MotL*. The status display in the faceplate gives feedback via the retrospective linking of all associated channel blocks (feedback signals, engine protection, etc.) to the input tag "OosActLi" of *MotL*.

All the components with the fault message "Bad" are also grouped and connected to the terminal "CSF" of the *MotL* engine block.

The connections "UserAna1" and "UserAna2" are available in the standard view of *MotL* for the connection of two analog values, with representation as auxiliary value 1 and 2. The "UserAna1" connection is connected to the engine current by default, while the "UserAna2" connection serves as a reserve for further project- and task-specific extensions.

Additional information for operating hours and operating cycles is available via the "SelFp1" port. The "SelFp2" port serves as a reserve for project-specific extensions.

In addition to this, *MotL* also gives three external messages in *WCMT_MotLean*. This is the activation of the PCS7 OS operation "Bypass active" of the Interlock, Permission and/or Protect block.

"external message 1" and "external message 3" messages are available for the user as a reserve for project-specific extensions.

Figure 2-3

PCS7 Message Configuration - SWL PCS7WCMT V901\S7-Programm\Charts\WCMT_MotLean\N

Last changed 02/06/2018 03:32:02 PM Type: FB1850 Display language: English (United States)

Message id	Message class	Prio	Event
MsgEvid1			
SIG1	PLC Process Control Message - Failure	0	\$\$BlockComment\$\$ Motor feedback error
SIG2	< no message >	0	\$\$BlockComment\$\$ Motor protection triggered
SIG3	PLC Process Control Message - Failure	0	\$\$BlockComment\$\$ External error has occurred
SIG4	PLC Process Control Message - Failure	0	\$\$BlockComment\$\$ External message 1
SIG5	PLC Process Control Message - Failure	0	\$\$BlockComment\$\$ External message 2
SIG6	PLC Process Control Message - Failure	0	\$\$BlockComment\$\$ External message 3
SIG7	< no message >	0	\$\$BlockComment\$\$ Reserve
SIG8	< no message >	0	\$\$BlockComment\$\$ Reserve

More>>

Save Cancel Help

The technological block *MotL* contains no activated tags for the short or long-term archive. If necessary, you can make project-specific adjustments here.

2.1.2 CFC subplan A/sheet 2

The *WCMT_MotLean* provides various local controls in subplan A sheet 2. These include the PMotL panel module from the Industry Library with data interface to the IPC/Comfort Panel via PROFIBUS DP/PROFINET and the switchable local local controls, with and without automation connection for drive control.

Local operation of control points

The user can choose all three local controls, or more variants, e.g. Panel control + local control (hardware) without automation. Additionally, there are two options for the local/remote switching:

1. Two-point operation

Direct switchover between local and remote (after activation via a key-operated switch), **without** neutral intermediate position (local - remote). This is the case if the signal "0" is present at the "*Sel_In2*" input of the *Local_0_Pos_Act* block. This variant is preferably used for bumpless drive switching between local and remote locations.

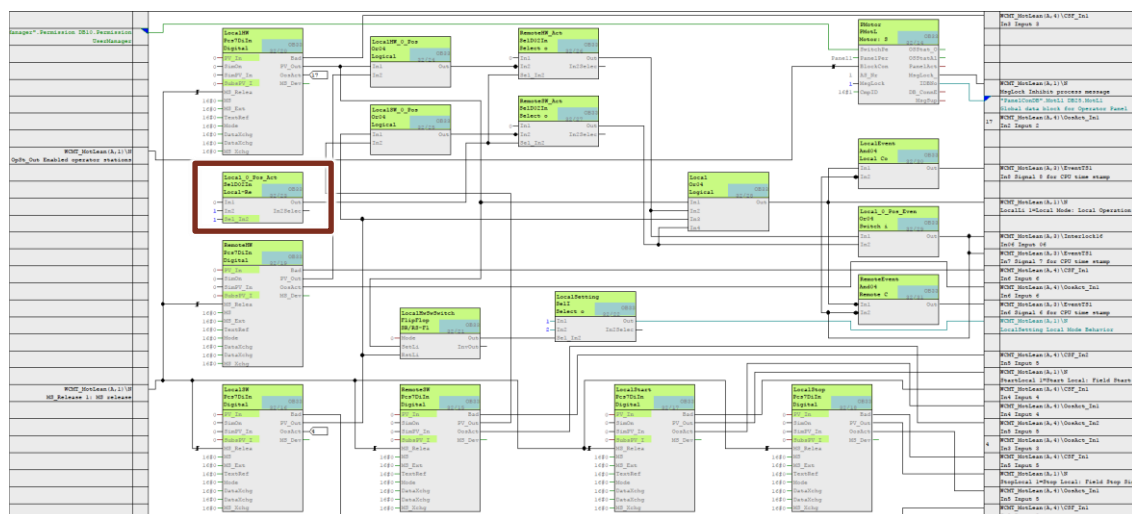
2. Three-point operation

Direct switchover between local and remote **with** neutral intermediate position (Local – 0 – Remote). This is the case if the signal "1" is present at the "Sel_In2" input of the *Local_0_Pos_Act* block. This variant is preferably used in combination with a repair switch as an additional drive switch-off (emergency stop).

Data exchange

In the AS, the tag "*BlockConnector*" (Panel) is connected to the *MotL* output "*OpSt_Out*" to enable data exchange between *MotL* and *PMotL*. All values (parameters, messages, commands) are read and written via this connection. An output tag *IDBNR* on *PMotL* links the AS with the icons and the corresponding faceplates on the IPC/Comfort Panel via not less than one instance DB with resource-dependent "structure". The *IDBNR* is the communications interface between devices. The data exchange on the IPC/Comfort Panel in the TIA Portal takes place with symbolic addressing.

Figure 2-4

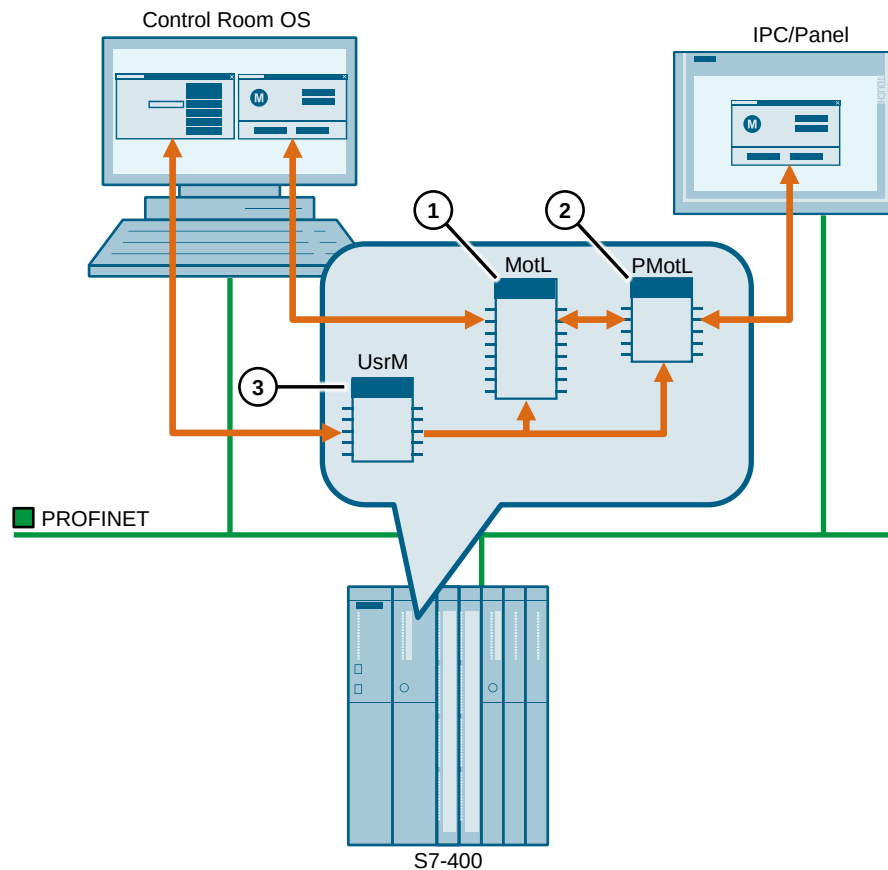


Panel operation

The following schematic picture shows the communication between automation, Comfort Panel and PCS 7 OS.

The Panel block always has a direct link to the technological block of PCS 7. If the Panel block *PMotL* and the technological block *MotL* are connected to the *WEMT_UsrM*, the inclusive integration of a multi-user concept (MWK) is done with the PCS 7 OS servers.

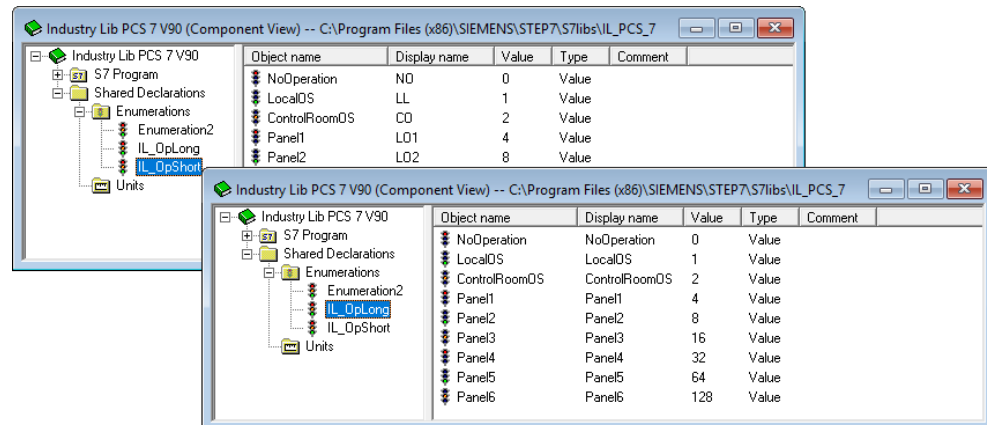
Figure 2-5



- (1) Technological block
- (2) Panel interface module
- (3) Block for selecting the control room

The multi-user concept can manage up to 8 different control locations (OS server and/or Panel). The term "operator location" is to be classified locally, e.g. local control room or panel. Each control location receives a switching permission number (PERM = permission), which is created in the PCS 7 project under "Global declarations/enumerations" and connected to the *WEMT_UsrM*. The prepared enumerations can be copied from the IL into the project.

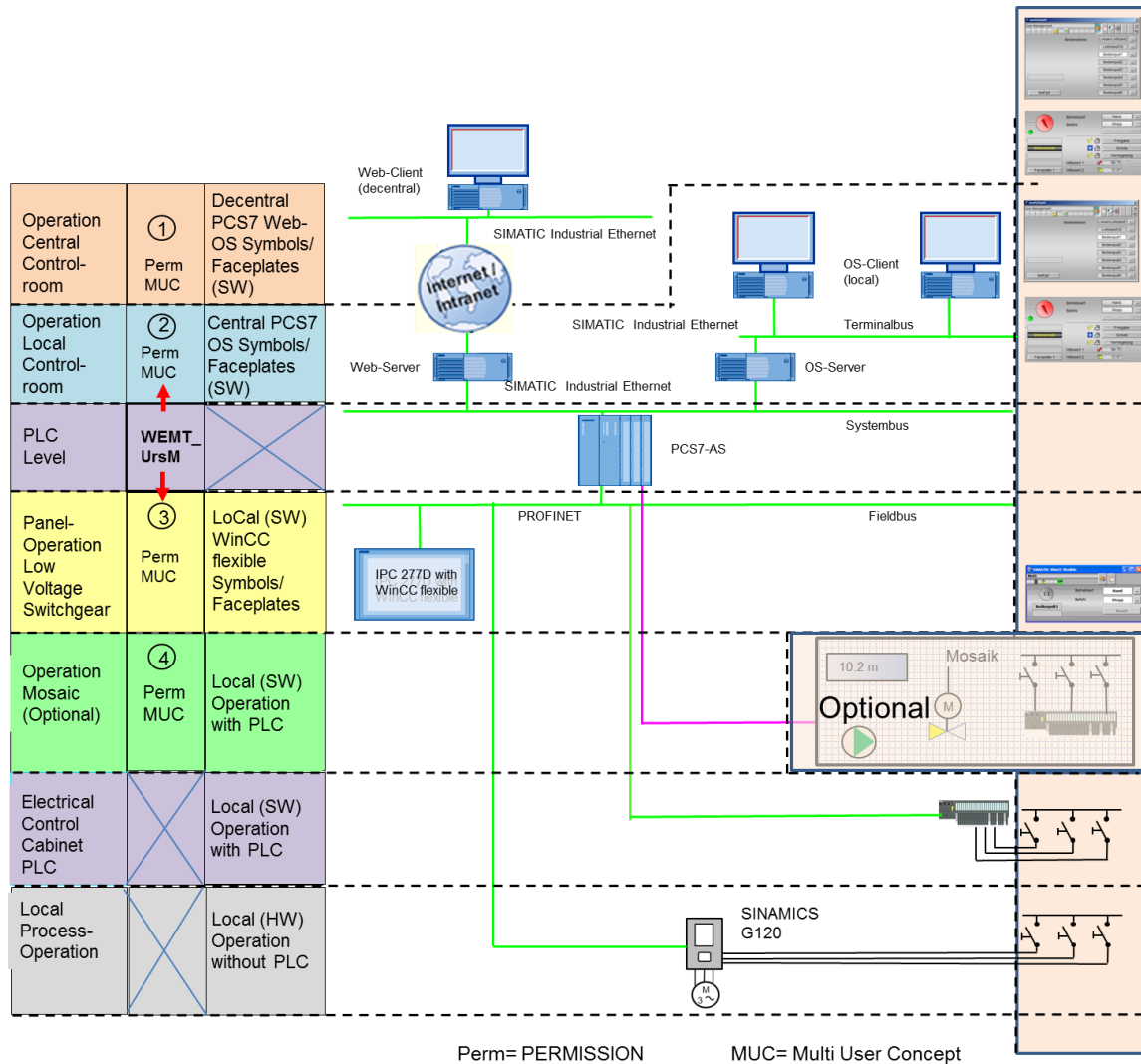
Figure 2-6



Each control location receives an additional switching permission number (PERM) on the OS Server page, which is stored in the internal tag management of WinCC Explorer. The local operating release is performed by comparing the value of the internal variable "@APLOpStation" with the value at the connection "OpSt_In" in the block instance of the panel block.

If they are identical, the operator receives access rights to the related process objects on the respective operator station. If they are not identical, it will only be possible to monitor the process. The parameters for the communication links needed between AS and Comfort Panel/IPC must be assigned in the HW Config and NetPro. In addition, the configuration must also be configured in the TIA Portal V14 SP1 Upd4 depending on the panel type (IPC/Comfort Panel).

Figure 2-7



Note

For further information and configuring aids regarding the multi-user concept and the Panel integration, please refer to the following item

"Integration of Comfort Panels, Operator Panels and S7-300 Package Units in SIMATIC PCS 7 with PCS 7 Industry Library"

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

or in the manual, section 2.4 "Multi-station control concept" of the Industry Library for PCS 7

<https://support.industry.siemens.com/cs/ww/en/view/109750809/65599501963>

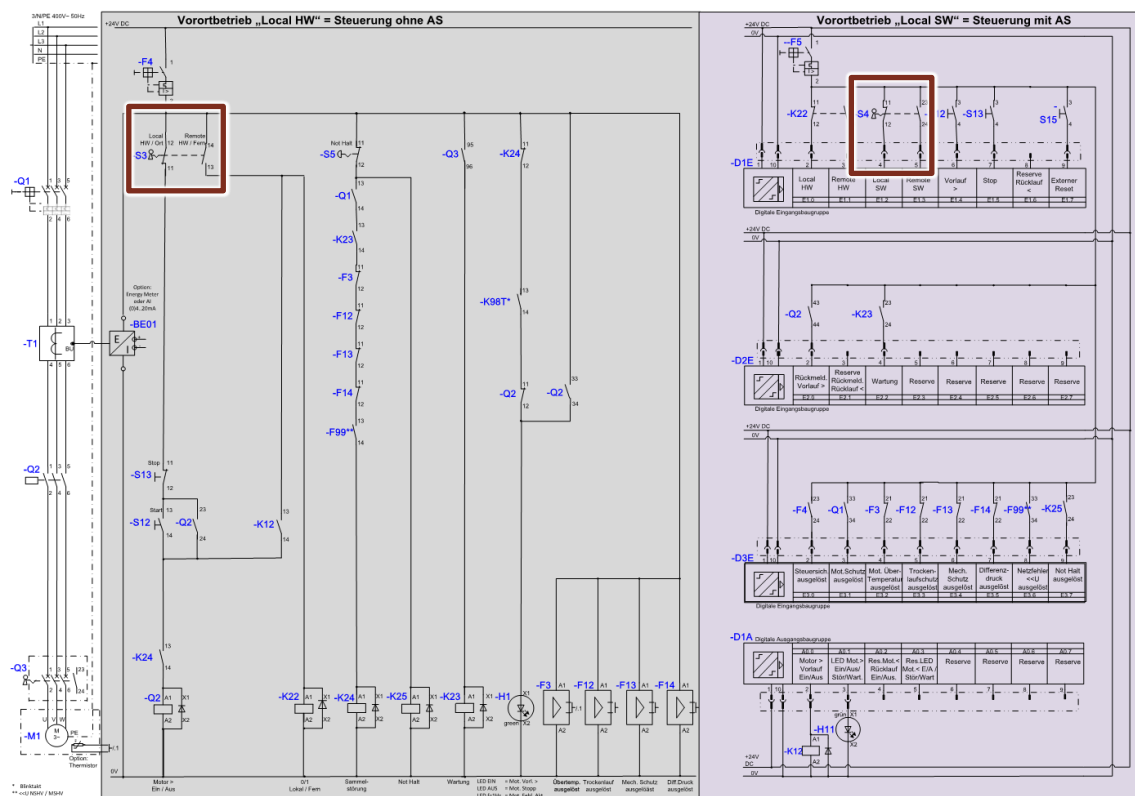
In addition to the Panel controls, subplan A sheet 2 also provides local controls with hardware and software-based connectivity. Especially in the water industry, both variants may be used together or individually. A typical variant is local control from the low-voltage switchgear with software-based control via the automation system.

If the software-based local switch is activated on "*LocalSw* = 1" (see key-operated switch "-S4"), the signal is forwarded to the *LocalHwSwSwitch* via the *LocalSW* block. Here, the switchover to "*LocalSetting* = 1" takes place via the AS with the preselection of the local control. The preselected operating mode is transferred to the *MotL* input "*LocSet*" via the corresponding locking structures. At the same time, the *Local* block enables permission for the external local control on *MotL*.

The "*Start*" and "*Stop*" pushbuttons are connected with input drivers *PCS7DiIn* *LocalStart* and *LocalStop* block (see pushbuttons "-S12" and "-S13"). These signals, too, are transmitted directly to the *MotL*.

The local control from the field (Local HW/Remote HW-K22) is purely hardware-based and in case automation fails, it offers an independent emergency control.

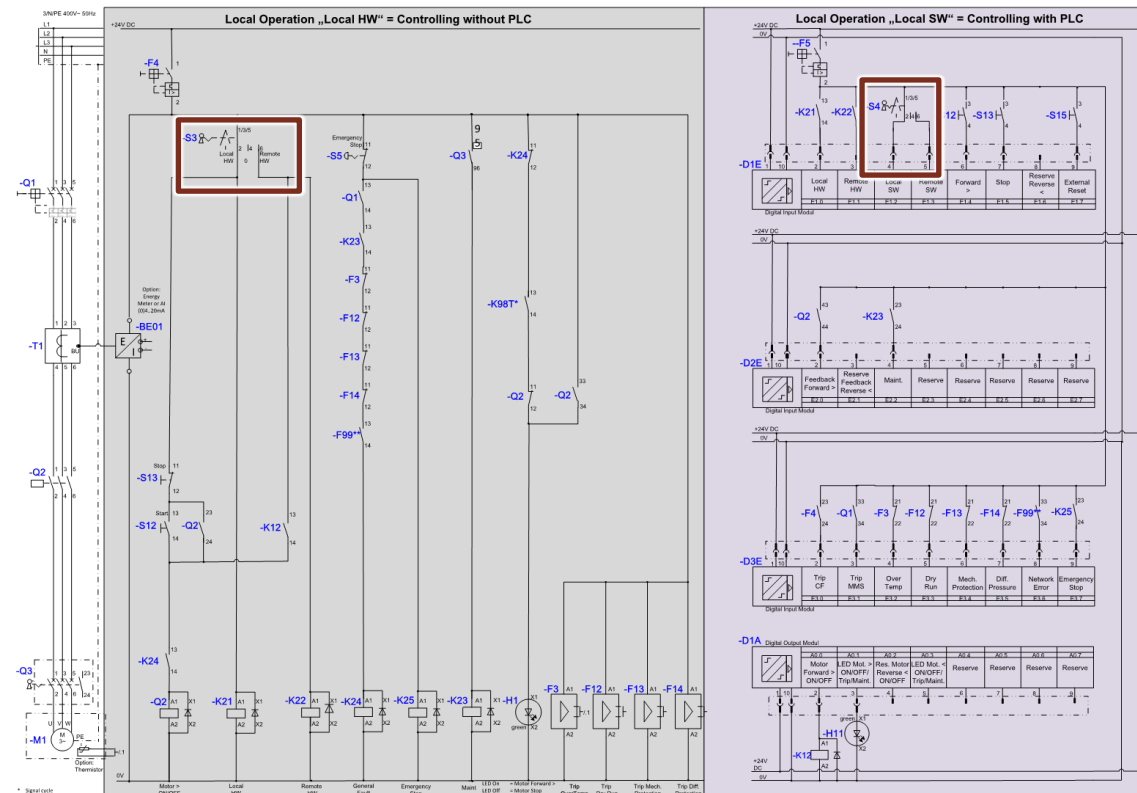
Figure 2-8: Two-Point Operation



By setting the local switch (-K22) to the input (E1.0) "*Location/Local HW=1*", the signal is transmitted via the CFC block "*LocalHWSwSwitch*". The preselection "*LocalSetting* = 2" with follow-up operation without AS control is thus activated. The preselected operating mode is forwarded by *LocalSetting* via output "*Out*" to the *MotL* input "*LocSet*". At the same time, the block enables *LocalEvent* permission via the output "*Out*" of the external local control on the *MotL* input "*LocalLi*". In this operating mode, only the drive feedback "*FbkRun*" is transmitted to *MotL* via *PCS7DiIn* in subplan A / sheet 1.

2 Water-specific control module types

Figure 2-9 Three-point operation



The hardware solution shown above is activated by changing parameter IN1 in the software plan WCMT MotLean from 0->1 at the block "Local_0_Pos_Act". When activated by a key switch, the local control considers a switchover between on-site, remote and a neutral intermediate position (Local – 0 – Remote). With the simultaneous use of both variants of local control (LocalSW + LocalHW), the hardware-based control (LocalHW) always has priority over the software-based control (LocalSW).

Figure 2-10

Local / Remote (2-Pos)

Local_0_Pos_Act\Out = 0

PCS7Diln-LocalHW_PVOut

PCS7Diln-RemoteHW_PVOut

PCS7Diln-LocalSW_PVOut

PCS7Diln-RemoteSW_PVOut

LocalEvent

Local_0_PosEvent

RemoteEvent

Local Setting (1/2=SW/HW)

1

0

0

1

1

0

0

2

0

1

0

1

0

0

1

2

1

0

1

0

1

0

0

2

0

1

1

0

1

0

0

1

Switch priority

Local HW > Local SW

High= Local

Low= Remote

Local - 0 -Remote (3-Pos)

Local_0_Pos_Act\Out = 1

PCS7Diln-LocalHW_PVOut

PCS7Diln-RemoteHW_PVOut

Local_HW_0_Pos

PCS7Diln-LocalSW_PVOut

PCS7Diln-RemoteSW_PVOut

Local_SW_0_Pos

LocalEvent

Local_0_PosEvent

RemoteEvent

Local Setting (1/2=SW/HW)

0

0

0

0

0

0

0

0

1

0

2

1

0

0

0

0

1

0

1

0

2

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2

0

0

1

0

1

0

0

1

0

2

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0

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1

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1

0

1

Switch priority local

HW > Local SW

High= 0-Position

Medium= Local

Low= Remote

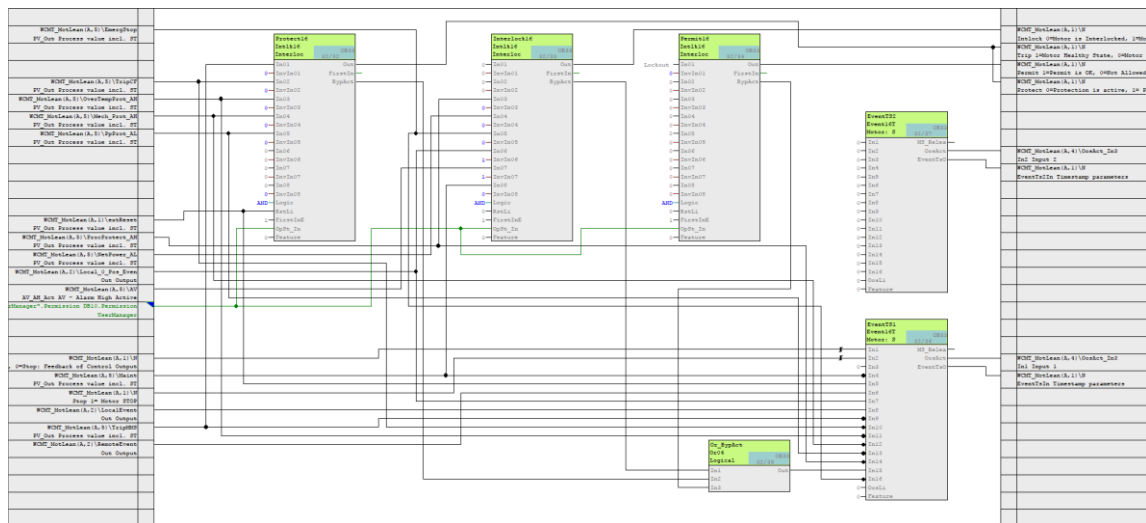
Note

Thanks to the integration of different operation modes, including an emergency mode, the PCS 7 Water Templates fulfill one of the main water-specific requirements in the water industry.

2.1.3 CFC subplan A/sheet 3

Subplan A sheet 3 takes into account the permission, protection, and locking function of *WCMT_MotLean*. Three *Interlock16* blocks from the APL provide sufficient protection capacity for the *MotL* drive and are connected to the inputs "Permit", "Protect" and "Interlock" connected by *MotL*. The interlock blocks have their own faceplates that can be selected via a separate button in the standard view of *MotL*. The bypass functions of *Permit16*, *Protect16* or *Interlock16* give the operator the opportunity to bridge the drive interlock and to maintain mandatory process sequences. This only applies in OS mode.

Figure 2-11



The newly implemented reporting behavior was implemented with two *EventTS* blocks. The *EventTS* blocks receive the operating and fault messages from the input drivers for drive monitoring in Sheet 5.

The locking function *Interlock* is conceptually similar to the *LOCK* connection type of older PCS 7 versions.

When the locking conditions are fulfilled, the drive goes into the safety position. If the locking conditions are no longer met, the drive can be restarted *without resetting the interlock*. A logical "1" at the inputs IN1..IN16 means the good state. Logical "0" means that interlocking is active.

The ON permission ("Permit = 1") enables the safety position of a drive to be exited through operator control or CFC/SFC connecting on *MotL*. If the block is not in the safety position, the ON permission has no effect. The compulsory "Switch off" function is performed through an interlocking condition ("Protect = 0") via the interlocking type *Protect*. After restoring the interlocking conditions ("Protect = 1"), a restart must be performed in the MANUAL mode on *MotL* (see *MotL* Feature Bit 31 = "1"). Resetting is additionally done with the Status Feature Bit 9 = "0" via the standard view of the *MotL* operating block or via the interconnectable input parameter in the CFC ("RstLi=1").

Protect16

All the input signals at *Protect16* block are in a good status with signal "1". If one of the input signals falls off ("0"), the drive is software-locked and at the same time the power output of the drive is enabled in hardware. The drive interlock only terminates when all the input signals are reset ("1") and the lock is reset in the *MotL* standard view.

Engine protection

Engine protection (subplan A/Sheet 5) is connected to the input "In01" of the *Protect16* via the *PCS7DiIn* input driver "TripMMS".

Control fuse

The control fuse of the local operating without AS (subplan A/Sheet 5) is connected to the input "In02" of *Protect16* via the *PCS7DiIn* input driver "TripCF".

Temperature rise / thermistor protection

Temperature rise/thermistor protection (subplan A/Sheet 5) is connected to input "In03" of *Protect16* via the *PCS7DiIn* input driver *OverTempProt_AH*.

Torque /chain / belt monitoring

The torque /chain / belt monitoring (subplan A/sheet 5) is connected via the *PCS7DiIn* input drive *Mech_Prot_AL* with the INPUT "In04" of *Protect16*.

Dry-run protection

The torque /chain / belt monitoring (subplan A/sheet 5) is connected via the *PCS7DiIn* input drive *PpProt_AL* with the input "In05" of *Protect16*.

Interlock16

All the input signals at *Protect16* block are in status good with signal "1". If one of the input signals falls off ("0"), the drive is software-locked and at the same time the power output of the drive is enabled in hardware. The drive interlock only terminates when all the input signals are present ("1") without reset of the lock in the *MotL* standard view.

Differential pressure / membrane monitoring

The differential pressure/membrane monitoring (subplan A/Sheet 5) is connected to the input "In03" of *Interlock16* via the *PCS7DiIn* input driver *ProcProtect_AH*.

Network voltage monitoring

The mains voltage monitoring (subplan A / Sheet 5) is interconnected to the "In04" of *Interlock16* via the *PCS7DiIn* input driver *NetPower_AL*.

Emergency stop button

The emergency stop switch (subplan A / Sheet 5) is connected to the input "In05" of *Interlock16* via the *PCS7DiIn* input driver *EmergStop*.

Local drive lock

The local drive lock (subplan A / sheet 3) is connected to the input "In06" of *Interlock16* via the OR block *Local_0_Pos_Even*.

Engine overcurrent

The engine overcurrent (subplan A / sheet 5) is connected to the input "*UserAna1*" of the engine module *MotL* via the *AV* block.

Permit16

The Permit16 block is available for project- and task-specific release locks and must be optionally interconnected and switched on.

CAUTION

Safety relevant regulations according to VDE 0100 /0105 or DGUV regulation 3 (German Statutory Accident Insurance) must not be invalidated with these functions described here. This must be always taken into consideration when creating the software.

Note

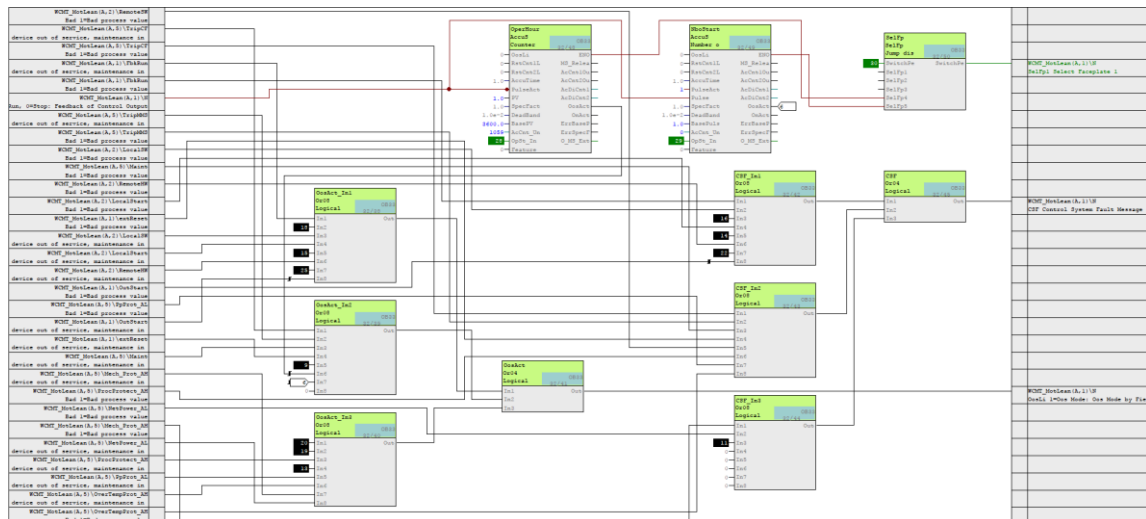
Further information can be found in chapter 8 "Interlock blocks" of the function manual Process control system PCS 7 Advanced Process Library:

<https://support.industry.siemens.com/cs/ww/en/view/109754967/73974323339>

2.1.4 CFC subplan A/sheet 4

Subplan A sheet 4 of *WCMT_MotLean* provides a faceplate jump distributor, a block with operating hours count and a block for operating cycles count.

Figure 2-12



The output "SwitchPe" of *SelfP* (jump distributor) is connected to the input "SelfP1" on the *MotL* block. The *SelfP* block originates from the IL and provides the user with three additional selection options (drive functions and/or additional measurements) on *MotL* in addition to the operating hours and the number of starts. The button "Faceplate 1" enables user access to the faceplate *SelfP* from the standard view of *MotL*.

The advantage of this variant is the functional grouping of technical components (e.g. pressure-, flow-, level- and temperature measurements) and energetic components (e.g. active energy, active power, apparent power, reactive power, cos phi and conductor voltage) with the same AKS identifier.

In addition, a block icon is eliminated for each function. This makes the process pictures clearer and increases system safety during operator input and monitoring of the process.

Note

The text for the button "Additional function" can be customized. This is done in the CFC at the *MotL* block under the properties of the connections "SelfP1" and "SelfP2" at the parameter "OS Additional Text". The same approach also applies to text changes in the *SelfP* block. Changed texts can only take effect and be displayed after the entire project has been compiled in the *MotL* or *SelfP* faceplate.

[illegible]

- A day counter (use within the last 24 hours)
- Long-term counter (use since start of first use)

The operating cycles counter was implemented with the *AccuS* (NboStart) block. It detects every position change of the engines and valves.

The diagram shows two 'Operator' blocks connected by a red line. The left block is 'Operator' and the right block is 'Operator'. Both blocks have a 'Feedback of Control Output' input. The left block has a 'Feedback of Control Output' input connected to a 'Feedback of Control Output' block. The right block has a 'Feedback of Control Output' input connected to a 'Feedback of Control Output' block. The diagram shows various control parameters and feedback loops.

2.1.5 CFC subplan A/sheet 5

The drive monitoring (engine protection, control fuse, torque monitoring, chain and belt monitoring, filter monitoring and/or other special functions) including motor protection with zero point suppression are implemented in subplan A sheet 5 of *WCMT_MotLean*.

Figure 2-15



Zero point suppression

In order to prevent a fluctuating engine current in the switched-off state, a zero-point suppression is generated by the *zero_supression* limiter block.

If a value less than 0.5 is present at the "In" input of the *zero_supression* limiter block, a logic "0" is switched to the input *In1* of the *SelA02In* block *SelZero* to thus maintain a stable value "0". If the engine current reaches at least 1 ampere (hysteresis), the real value of the engine current is released again. The Wire break monitoring at the driver block is always enabled.

Engine current monitoring

The downstream AV module extends MotL standard functions with the limit value view in the faceplate. The operator has the possibility to use additional operating and monitoring conditions for the engine current from the faceplate directly. The engine current rise is transferred to the *MotL* block and interlocks the drive via the *Interlock16* interlock block.

Table 2-2

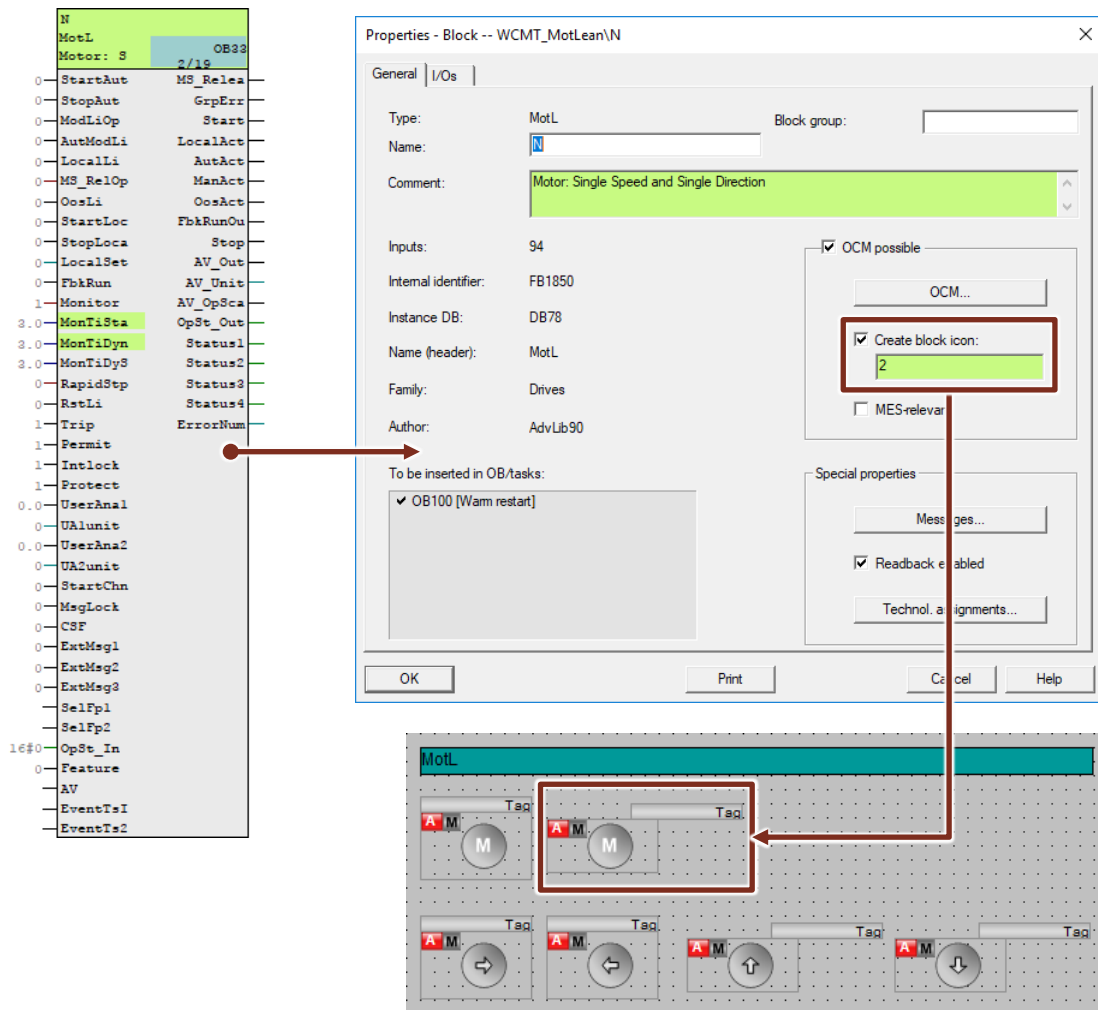
Contact	Block name	Function
HW: Contact	Maint	1/0 = maintenance switch ON/Maintenance_Service
HW: Contact	TripMMS	1/0 = engine protection ON/triggered
HW: Contact	TripCF	1/0 = Operating fuse ON/triggered
HW: Contact	EmergStop	1/0 = emergency stop not triggered/emergency stop triggered
HW: Contact	NetPower_AL	1/0 = Supply voltage i.o./Network failure NSHV/MSHV
HW: Contact	Mech_Prot_AH	1/0 = Torque /Chain/Belt monitoring i.o./triggered
HW: Contact	PpProt_AL	1/0 = Dry-run protection i.o./triggered
HW: Contact	OverTempProt_AH	1/0 = temperature rise/thermistor protection i.o./triggered
HW: Contact	ProcProtect_AH	1/0 = Differential pressure/membrane monitoring i.o./triggered
Analog value	MotorCurrent	Limit value monitoring (>19mA): Engine overcurrent triggered

The signal from the channel driver *Maint* (maintenance/service) is connected via OR blocks to the "OosLi" connection of engine block *MotL* (sheet 1). In an fault-free state the signal delivers a "1" signal. When the repair switch is actuated, the *MotL* block switches off the drive and signals that it is out of operation. Warnings, faults and operating messages are suppressed in this operating mode.

2.1.6 WCMT_MotLean OS faceplates and symbols

Each control module type (WCMTs) of the PCS 7 Water Templates receives only one symbol on the OS for the technological core function, including the associated Panel icon if necessary (the latter is missing if the block is deselected or unavailable). The standard APL faceplates of *MotL* are used in *WCMT_MotLean* without changes. This pre-configured variant can be extended at any time in a task-specific manner.

Figure 2-16



Note

The used picture blocks and symbols of the WCMT_MotLean are described in the corresponding profile. The profiles are part of this application example and you can obtain them from your regional sales partner.

In the section entitled [3 WCMT and WEMT profiles](#) you will find the description of a profile using an example.

Further information on the Standard PCS 7 OS faceplates and OS symbols can be found in the manual "SIMATIC Process Control System PCS 7 Advanced Process Library":

<https://support.industry.siemens.com/cs/ww/en/view/109750809>

2.1.7 WCMT_MotLean Panel faceplate/symbols

The panel symbols and faceplates form part of the PCS 7 Industry Library and unlike the PCS 7 OS, they are not provided automatically for the individual control unit types (WCMTs) of the PCS 7 Water templates.

The user creates the plant-specific pictures for the Panel/IPC operator input and monitoring separately via the TIA Portal V14 SP1 Upd4.

Note

The used picture blocks and symbols of the WCMT_MotLean are described in the corresponding profile. The profiles are part of this application example and you can obtain them from your regional sales partner.

In the section entitled [3 WCMT and WEMT profiles](#) you will find the description of a profile using an example.

For further information and configuration aids on the Panel integration, refer to the item: "Integration of Operator Panels in SIMATIC PCS 7 with the Industry Library"

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

or the Industry Library manual for PCS 7:

<https://support.industry.siemens.com/cs/ww/en/view/109750809>

2.2 WCMT_MotLean_FbMMS template

The example *WCMT_MotLean_FbMMS* describes the water-specific functions of a SIMOCODE pro V with field bus connection (PROFIBUS DP) via the APL driver block *FbSwtMMS* for a drive function with one direction of rotation and one speed.

The example is applicable to all other templates with the same nominal signal connection "_FbMMS" and also essentially applies to the fieldbus connection via PROFINET.

The configuration of the communication of a SIMOCODE pro V (PN) with PROFINET is described in detail in the SIMOCODE pro - Communication function manual:

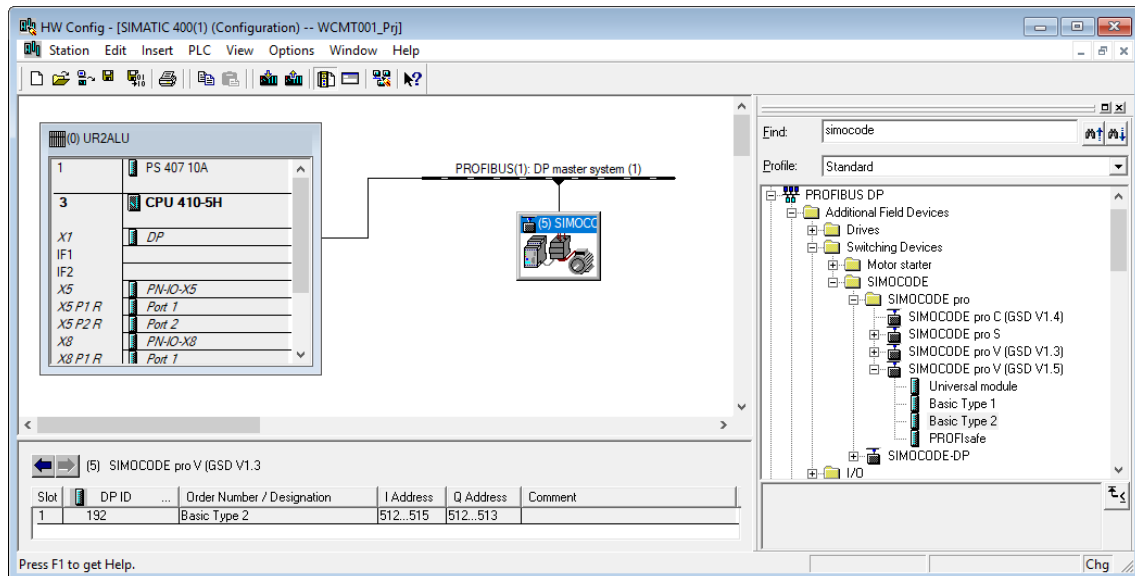
<https://support.industry.siemens.com/cs/ww/en/view/109743960>

This PCS 7 Water Template only differs from the previously described *WCMT_MotLean* template in subplan A sheet 1 and sheet 5. The differences are described in detail in this section. *WCMT_MotLean_FbMMS* uses the basic type 3 (telegram type) between SIMOCODE pro V and the automation via PROFIBUS.

Basic type 1 is supported by the SIMOCODE but is not used in conjunction with the example *WCMT_MotLean_FbMMS*. The following figure shows the path in the standard hardware catalog in the HW Config. On the PROFIBUS DP master system, the SIMOCODE Pro V with basic type 2 is connected to the AS.

The SIMOCODE Pro V contains four bytes of input data and two bytes of output data in the telegram structure of basic type 2. These are used as interface to the channel block *FbSwtMMS*.

Figure 2-17



In the hardware configuration, the integration of SIMOCODE pro V for PROFIBUS DP and PROFINET should be implemented via GSD.

For SIMOCODE pro V with PROFINET, only the base type 3 is used in the Water Templates. With 20 bytes of input and 6 bytes of output data, the maximum, cyclic

data exchange is used. Basic type 2 and basic type 3 are identical in the first 4 bytes of input and 2 bytes of output data. Base type 3 provides the following information from byte 5 to byte 19 in addition to the channel block FbSwtMMS via the peripheral addressing:

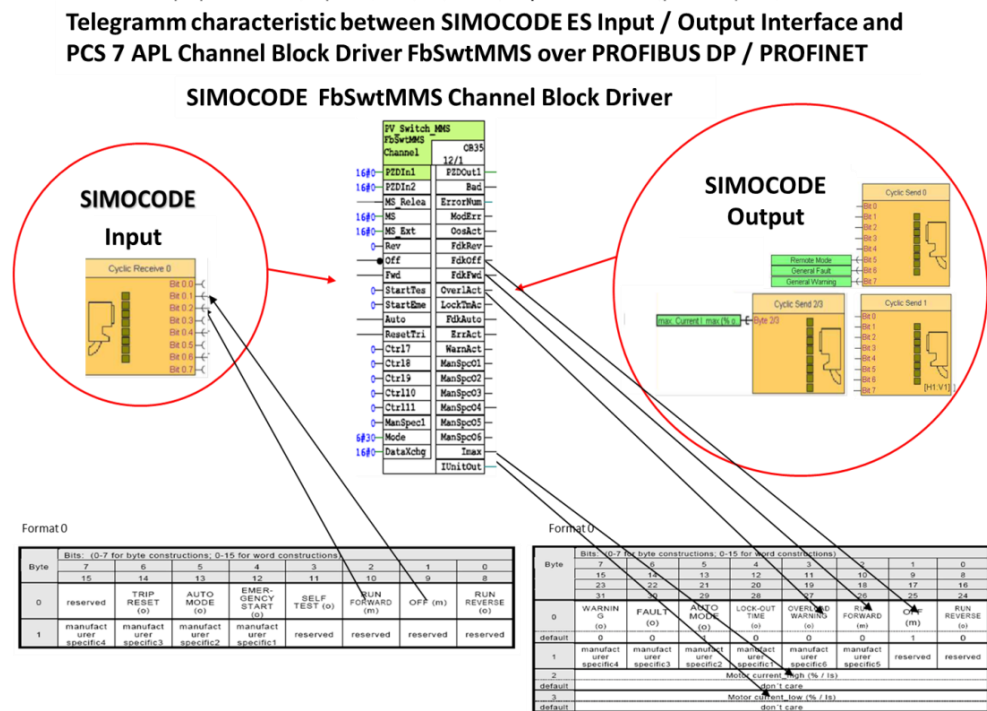
- Motor temperature in [$^{\circ}$ C]
- cos phi
- Active power in [W]
- Apparent power in [VA]
- Active energy in [kWh]

The provided SIMOCODE measured values were created as examples for the SIMOCODE WCMT and can be modified for specific projects. For example, you can change the parameter active energy with the parameter operating hours.

In addition, you must adapt the provided SIMOCODE device parameterization and the WCMT.

The following figure gives a schematic description of the input and output interfaces of SIMOCODE pro V ES and the channel block FbSwtMMS. The SIMOCODE pro V contains the telegram structure of the "basic type 2" with 4 byte input and 2 byte output data.

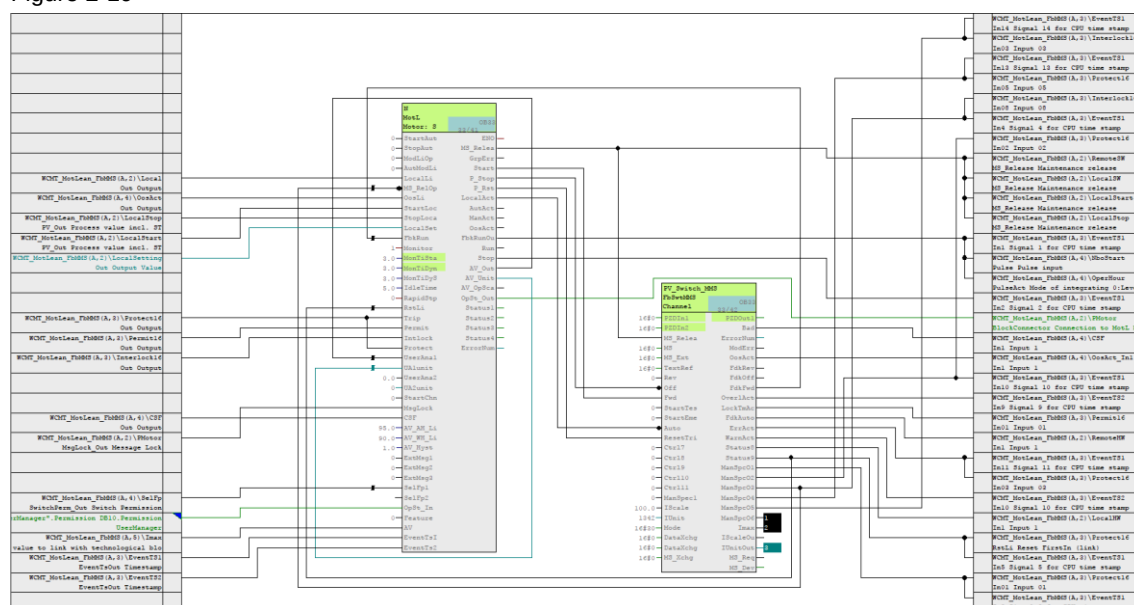
Figure 2-18



A detailed description of the interface for the standard block FbSwtMMS can be found in Section 15.7 of the PCS 7 Advanced Process Library (APL) manual:
<https://support.industry.siemens.com/cs/ww/en/view/109739941>

For further information on the connection with PROFIBUS DP, please refer to Section 12 "Communication" of the "SIMOCODE pro V PB" manual:
<https://support.industry.siemens.com/cs/ww/en/view/20017780>

Figure 2-19



In subplan A sheet 1, the *WCMT_MotLean_FbMMS* provides a SIMOCODE pro V drive function with one direction of rotation and one speed via the field bus driver block *FbSwtMMS* of the APL. In doing so, the driver block *FbSwtMMS* supplies/removes the *MotL* cyclically with the SIMOCODE pro V input/output peripherals via Send and Receive Telegrams.

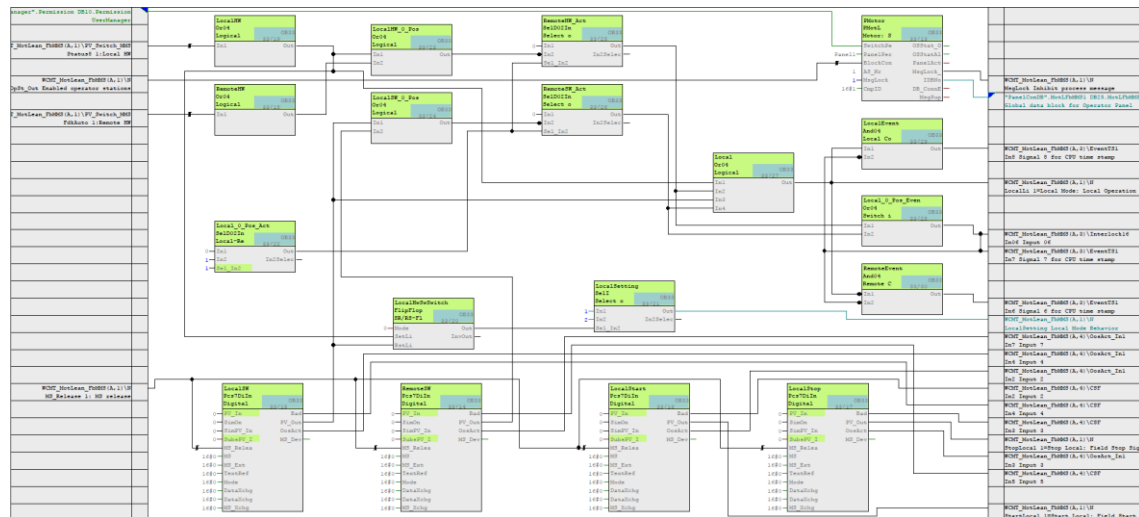
The technological core functions of *WCMT_MotLean_FbMMS* are identical to the template *WCMT_MotLean* except for two details.

1. The first difference to the template *WCMT_MotLean* Section 1.5 subplan A sheet 1 is the field bus driver block *FbSwtMMS*.
2. The additional provision of engine current ($I_{\max}$) in [%] or [A] from SIMOCODE pro V to the automation system. This analog value is described in detail as a special function in *WCMT_MotLean_FbMMS* subplan A sheet 5. The conversion percentage according to Ampere is carried out by means of a two-point equation using the *Exchange* block. The user must parameterize via *LowScale* and *HighScale* the corresponding measuring unit start and end values and also parameterize the respective unit via the *SelUnit* block.

2.2.2 CFC subplan A sheet 2

The project planning corresponds to that of the WCMT_MotLean. Further information can be found in section: [2.1.2 CFC subplan A/sheet 2](#).

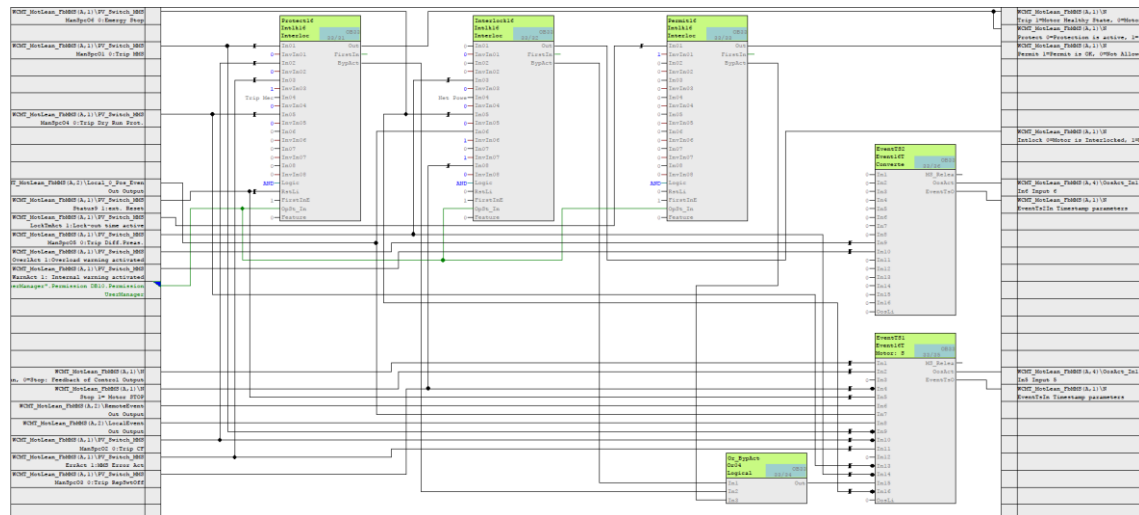
Figure 2-20



2.2.3 CFC subplan A sheet 3

The description corresponds to that of the WCMT_MotLean. Further information can be found in section: [2.1.3 CFC subplan A/sheet 3](#).

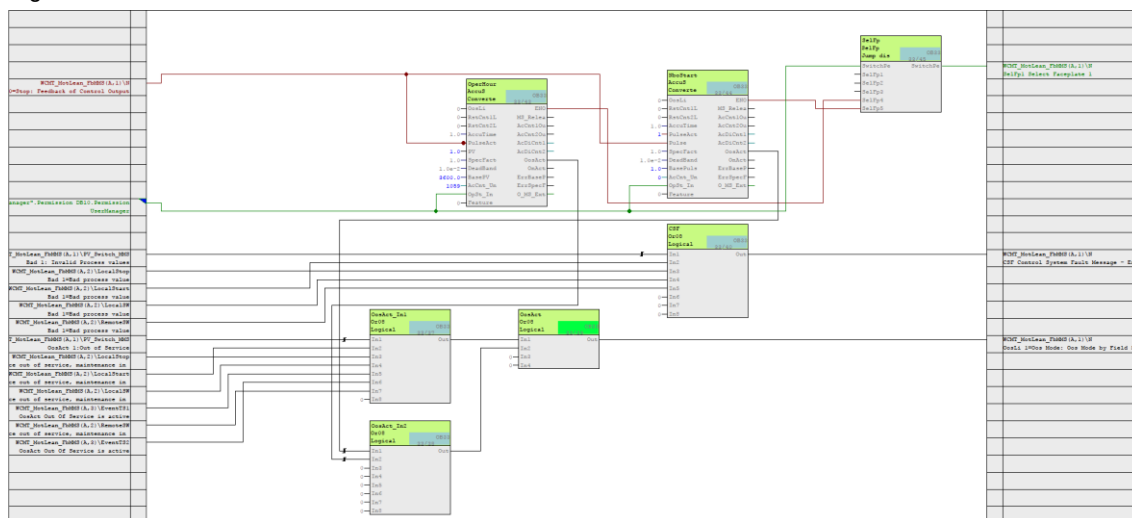
Figure 2-21



2.2.4 CFC subplan A sheet 4

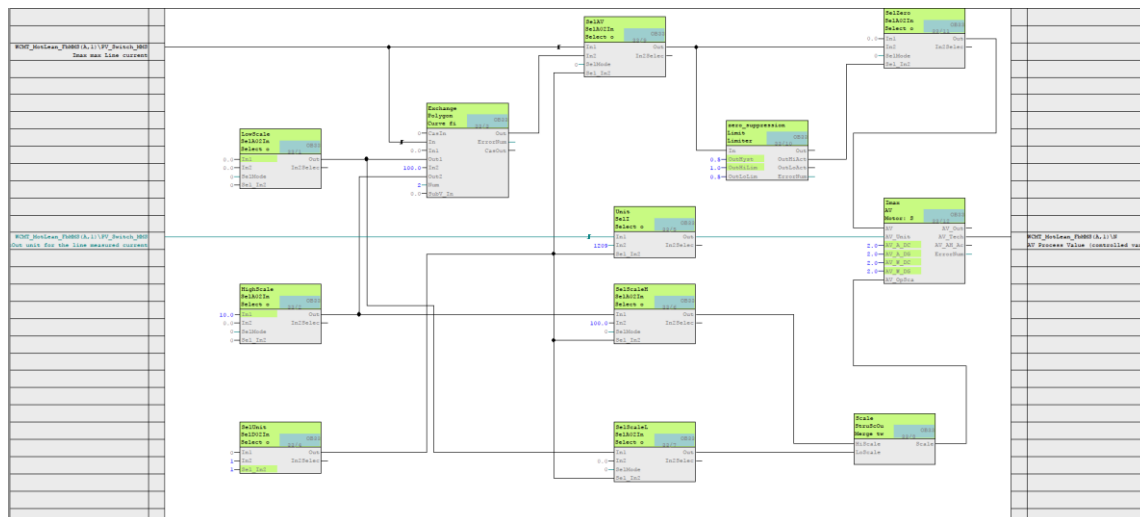
The description corresponds to that of the WCMT_MotLean. Further information can be found in section: [2.1.4 CFC subplan A/sheet 4](#).

Figure 2-22



2.2.5 CFC subplan A sheet 5

Figure 2-23



In subplan A sheet 5 of *WCMT_MotLean_FbMMS*, the transmitted analog value “Engine current” is provided in the *Exchange* block either in [%] (SIMOCODE standard) or in a scalable measuring range, e.g. 0 – 10A, via a two-point equation. The two-point equation can be parameterized and must be adapted to any measuring range for each project.

A programmable delay time suppresses an alarm in case of a short-term exceeding of I_{max} (chatter suppression). If this time is exceeded and simultaneous value $> I_{max}$, an alarm message is generated.

An additional zero point suppression can also be activated as an offset (0.0 A). The offset suppresses a measured-value drift < 0.0 A.

If the connected transmitter (4...20mA) falls below the value of <3.8mA, an alarm message "wire break" is still generated for the analog channel, despite the activated offset. This function is optional and can be configured according to the plant or removed in the WCMT.

In *WCMT_MotLean_FbMMS* subplan A sheet 1, the engine current ($I_{\max}$) is interconnected with the *MotL* via "AV". An additional Limit View is also provided for it in *MotL*.

Depending on the programmable pre-selection in the *Exchange* block, the unit [%] or [A], including the measuring range start/end and four configurable limits are displayed for the engine current ($I_{\max}$).

2.2.6 Drive parameter assignment with SIMOCODE ES

The functional diagram of the SIMOCODE pro V gives an overview of the final drive parameter assignment with interfaces for hardware and software.

In terms of hardware, the SIMOCODE is connected via the inputs of the digital modules DM1 and DM2. The power contactor for the drive is switched via the function block (FB) SIMOCODE Basic Unit (GG) outputs.

The messages of the drive status are output via the digital module DM1 to the message LED.

An extension of the SIMOCODE with a SIMOCODE control panel is possible at any time. For this, the SIMOCODE device parameterization must be additionally adjusted.

In terms of software, the function block Cycl.Control 0 receives the control commands from the PCS 7 driver block *FbSwtMMS* via the communication connection.

Table 2-3

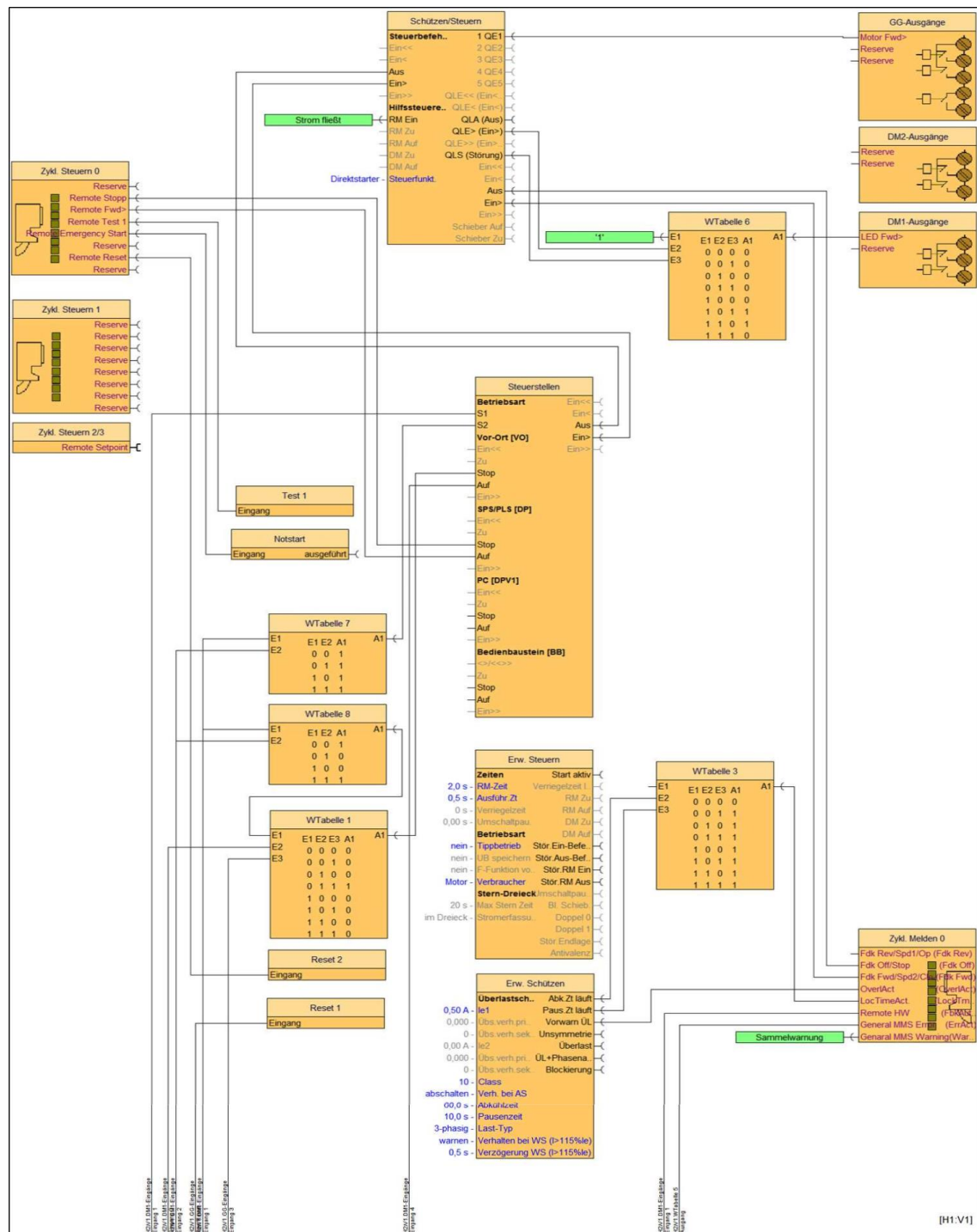
Input tag <i>FbSwtMMS</i>	Communication	SIMOCODE Cycl.Control 0
Rev	→	Command Rev/Close/Fwd>>
Off	→	Command Off/Stop
Fwd	→	Command Fwd/Open/Fwd>
StartTest	→	Command StartTest
StartEmerg	→	Command StartEmerg
Auto	→	Command Remote
ResetTrip	→	Command ResetTrip
Reserve	→	Reserve

On the other hand, the most important operational messages or engine current ($I_{\max}$) of the SIMOCODE are sent to the PCS 7 driver block *FbSwtMMS* via the function blocks cycl. Control 0...3.

<https://support.industry.siemens.com/cs/ww/en/view/109743951>

2 Water-specific control module types

Figure 2-24 Direct starter PROFIBUS DP



2 Water-specific control module types

Figure 2-25 Direct starter PROFIBUS DP

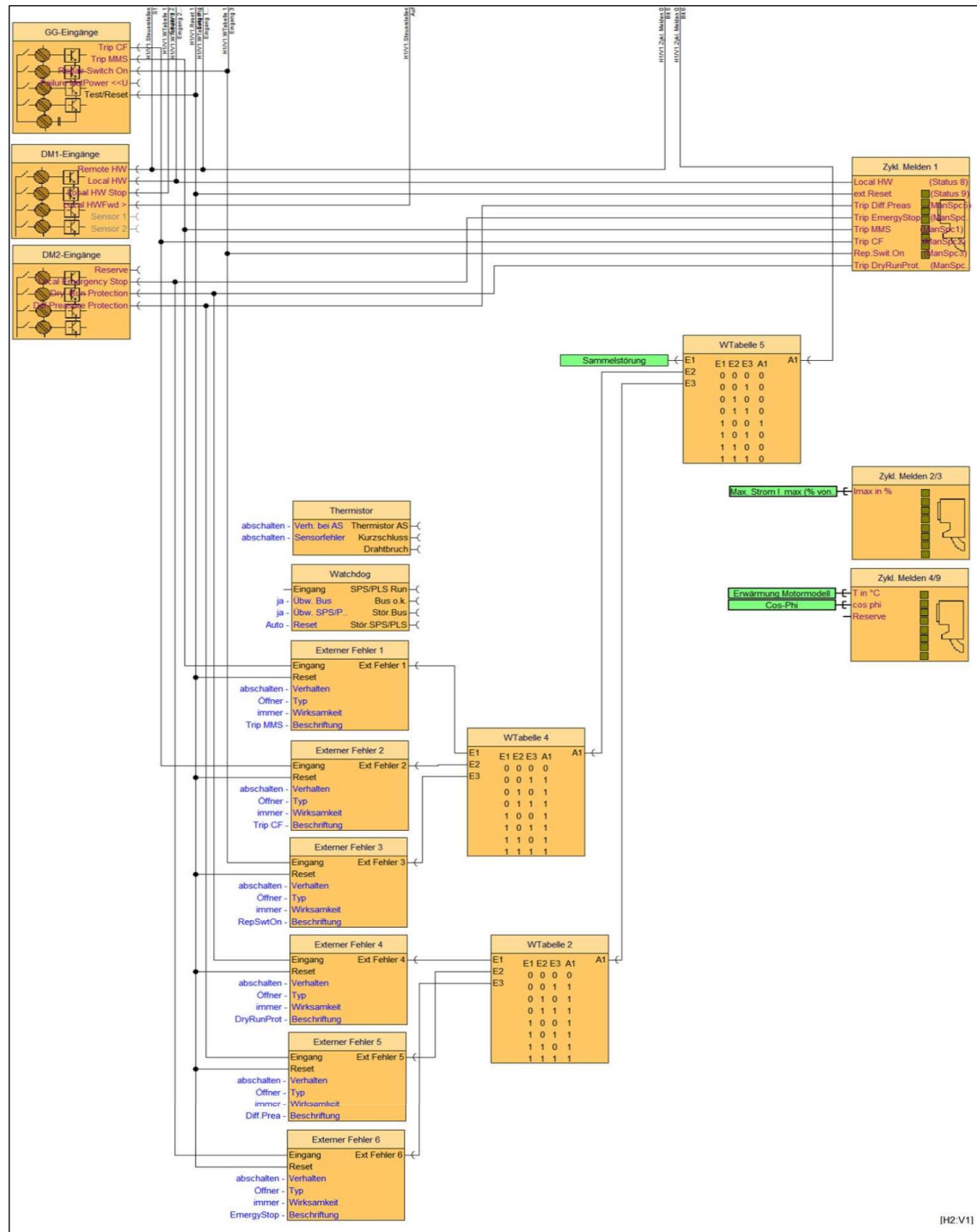
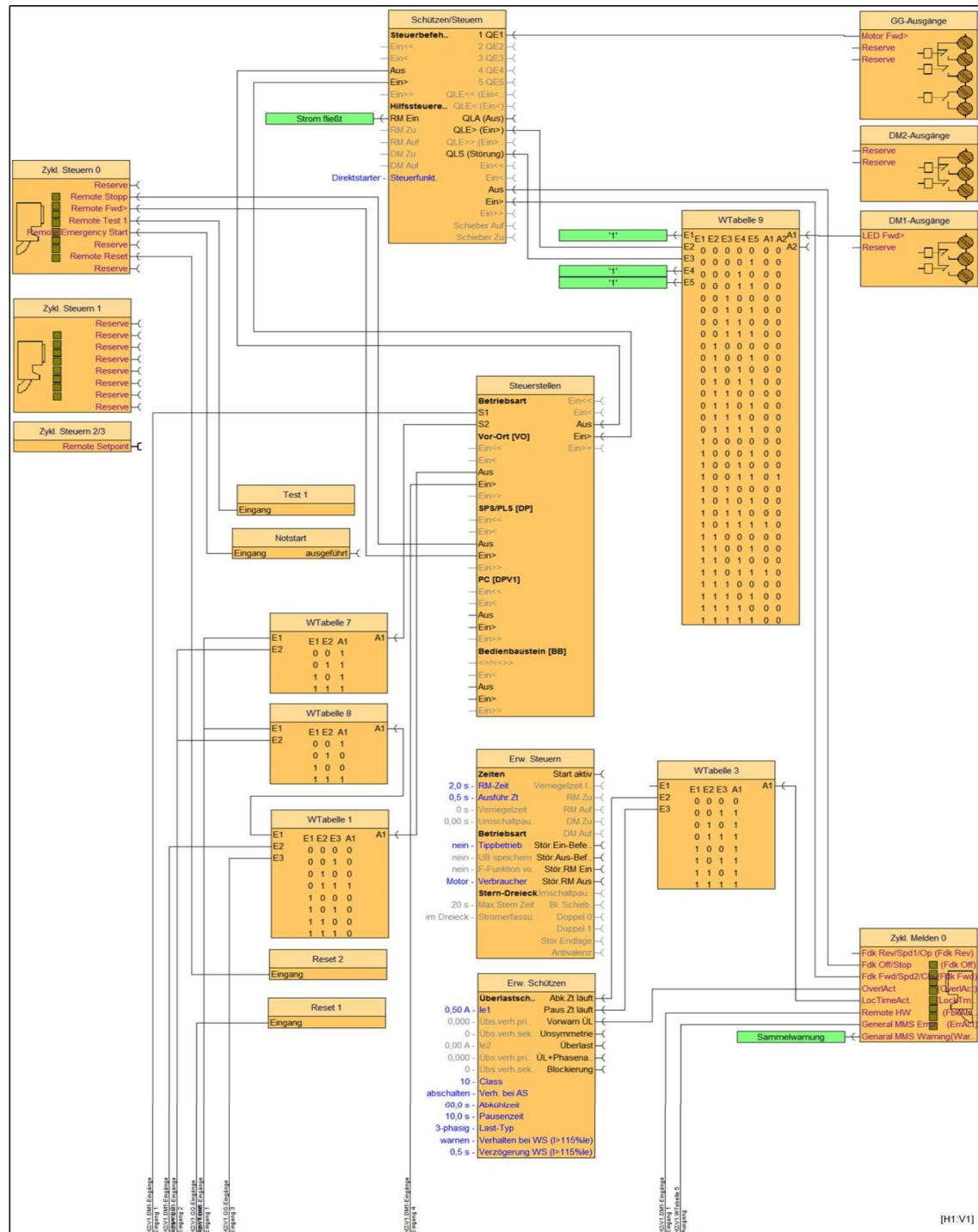
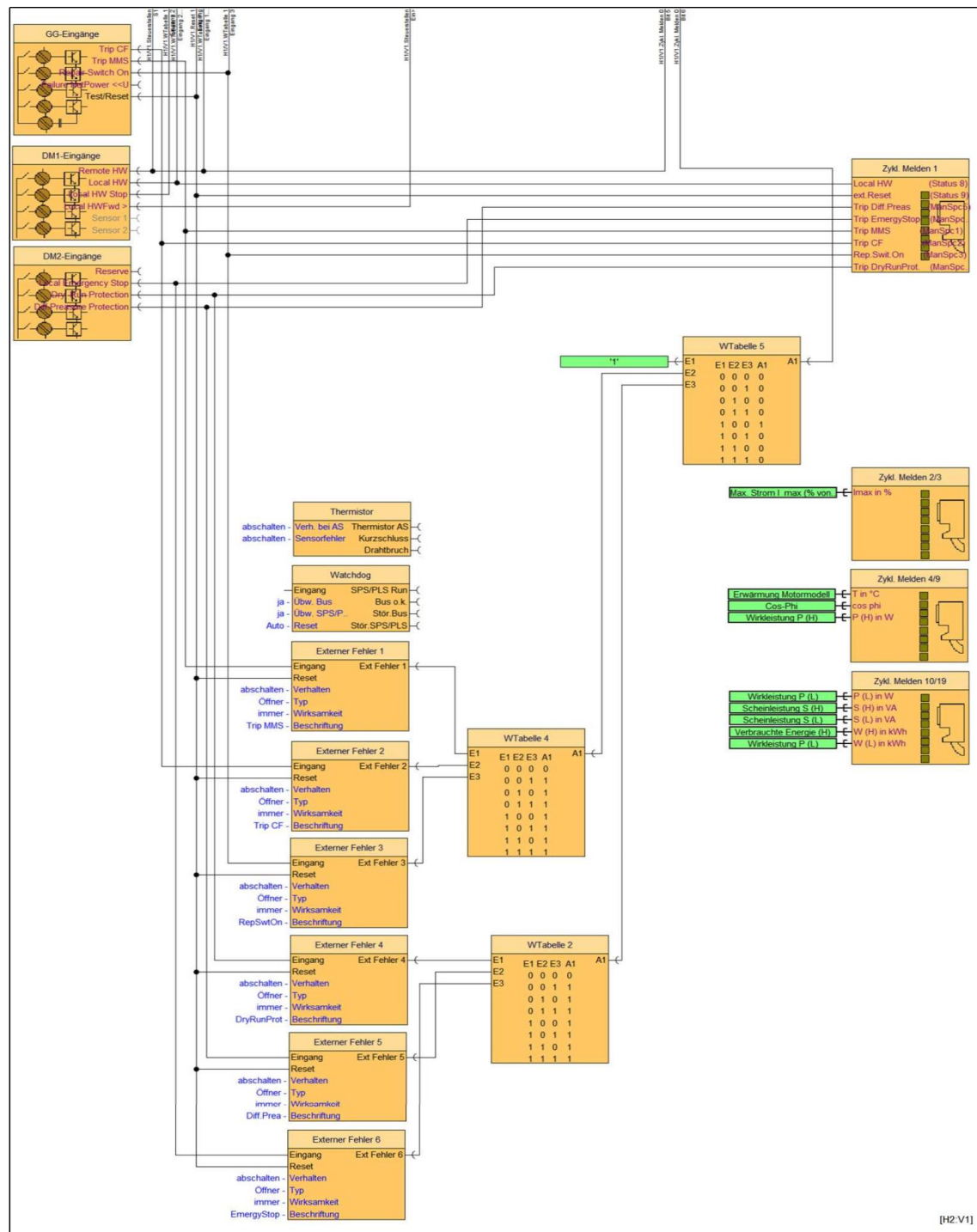


Figure 2-26 Direct starter PROFINET



2 Water-specific control module types

Figure 2-27 Direct starter PROFINET



The local operation (three-point operation) is activated on SIMOCODE via a switch with NO contact (place 0=Remote).

The signals are transferred to the SIMOCODE via the inputs of the digital module 1 (DM1) IN1 and IN2. After internal processing of the weeds in the SIMOCODE logic, the signals RemoteHW and LocalHW are sent to PCS 7 via the communication blocks "cycl. messaging 0/1". At the output signals "FbkAuto" and "STATUS8" of the APL interface block FbSwtMMS the output is cyclic updated.

Table 2-4

SIMOCODE Cycl. MSG 0	Communication	FbSwtMMS output variable
FbkRev	→	FbkRes/FbkClosed/Fwd>>
FbkOff	→	FbkOff/Stop
FbkFwd	→	FbkFwd/FbkOpen/Fwd>
OverlAct	→	OverlAct
LockTmAct	→	LockTmAct
RemoteHW	→	FbkAuto
MMSErrAct	→	ErrAct
InternalWarnAct	→	WarnAct

Table 2-5

SIMOCODE Cycl. MSG 1	Communication	FbSwtMMS output variable
LocalHW	→	Status08
ext.Reset	→	Status09
TripDiff.Preas ²	→	ManSpec05
TripEmergStop	→	ManSpec06
TripMMS	→	ManSpec01
TripCF	→	ManSpec02
TripRepSwtOff	→	ManSpec03
TripDryRun ³	→	ManSpec04

² At Vlv and VlvMot replaced by torque monitoring close

³ At Vlv and VlvMot replaced by torque monitoring open

Table 2-6

	SIMOCODE Internal	
Channel diagnostics PB	↳	OoS_Act
Channel diagnostics PB	↳	ModErr

1. The activation of the maintenance switch on SIMOCODE is also carried out via a switch with NO contact (maintenance switch ON/maintenance switch OFF -> Maintenance = 1/0). The signal is transmitted to the software block "GG inputs" via the hardware connection IN3 on SIMOCODE. The output "Maint" of GG inputs is interconnected with SIMOCODE ES and the communication block "Cycl. Report 1" interconnected with input tag "TripRepSwtOff". The standard telegram provides this external signal cyclically on the PCS 7 driver FbSwtMMS via the output tag "ManSpec03".
2. The integrated RESET button on the SIMOCODE is activated via a NO contact (RESET ON/RESET OFF = 1/0). The signal is transmitted to the software module "GG inputs" via the internal connection IN5 on SIMOCODE. The output "Test / Reset" of "GG-Inputs" of the SIMOCODE is connected with the input tag "ext.Reset" via the internal logic with the communication block "Cycle message 1". The standard telegram provides this signal cyclically on the PCS 7 APL driver block *FbSwtMMS* via the output tag "Status09".

Optionally, the controls and the associated feedback messages can also be done by means of pushbuttons/switches or indicator lights. However this requires parameter reassignment with SIMOCODE ES (subject to license). The "ON/OFF" connections from the function block "Control points" to the function block "BB keys" are deleted and connected to the connections of the function block "GG inputs". The feedback signals QLE/QLA of the function block "Protect/Control" must be interconnected from the function block "BB-LED" to the function block "GG outputs" or to an additional SIMOCODE output module.

Note

Project planning of direct starters with the APL channel block "FbSwtMMS" in SIMATIC PCS 7

<https://support.industry.siemens.com/cs/ww/en/view/64182525>

SIMOCODE pro System Manual:

<https://support.industry.siemens.com/cs/ww/en/view/109743957>

2.2.7 Activation of Local/Remote switchover with SIMOCODE ES

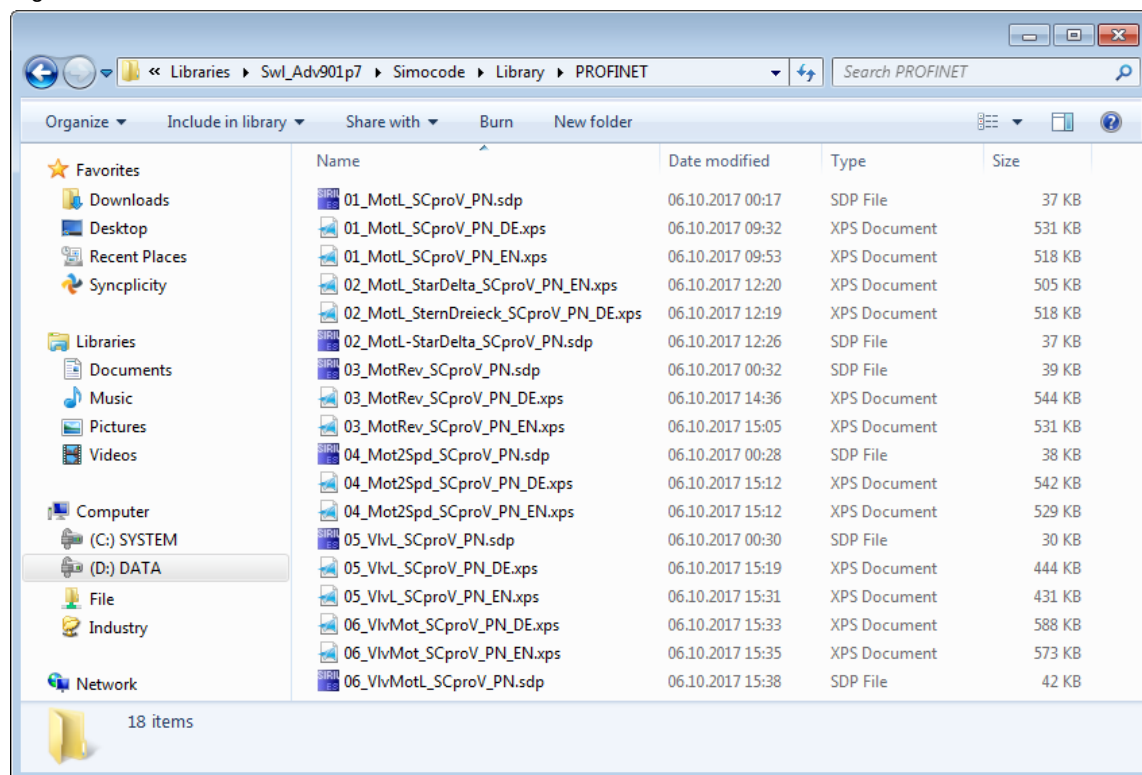
The parameters of the local control location switchover S1/S2 at the control point FB (HW Local/0/Remote) are assigned via the Engineering Tool SIMOCODE ES.

2.2.8 SIMOCODE ES drive parameter assignment

The PCS 7 Water Templates also provide the suitable drive parameters for SIMOCODE ES with each template that has SIMOCODE pro V connection.

The folders "...\\Swl_Adv901p7\\Simocode\\Library\\PROFIBUS\\" and "...\\Swl_Adv901p7\\Simocode\\Library\\PROFINET\\" contain the project files for SIMOCODE ES. This drive variants are configured: MotL, Mot2Spd, MotRev, Vlv and VlvMot.

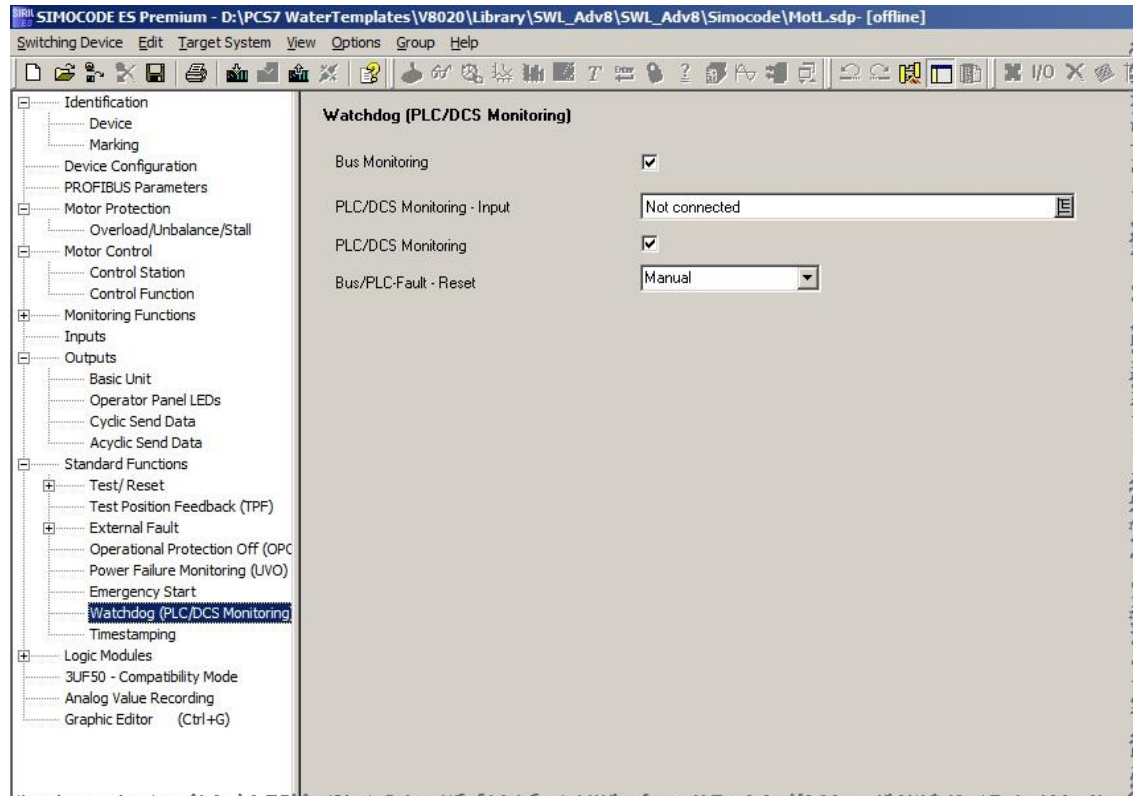
Figure 2-28



2.2.9 Parameter assignment for bus monitoring with SIMOCODE ES

For active communication monitoring between AS and SIMOCODE via PROFIBUS DP, the parameterization must be observed as shown in the following figure.

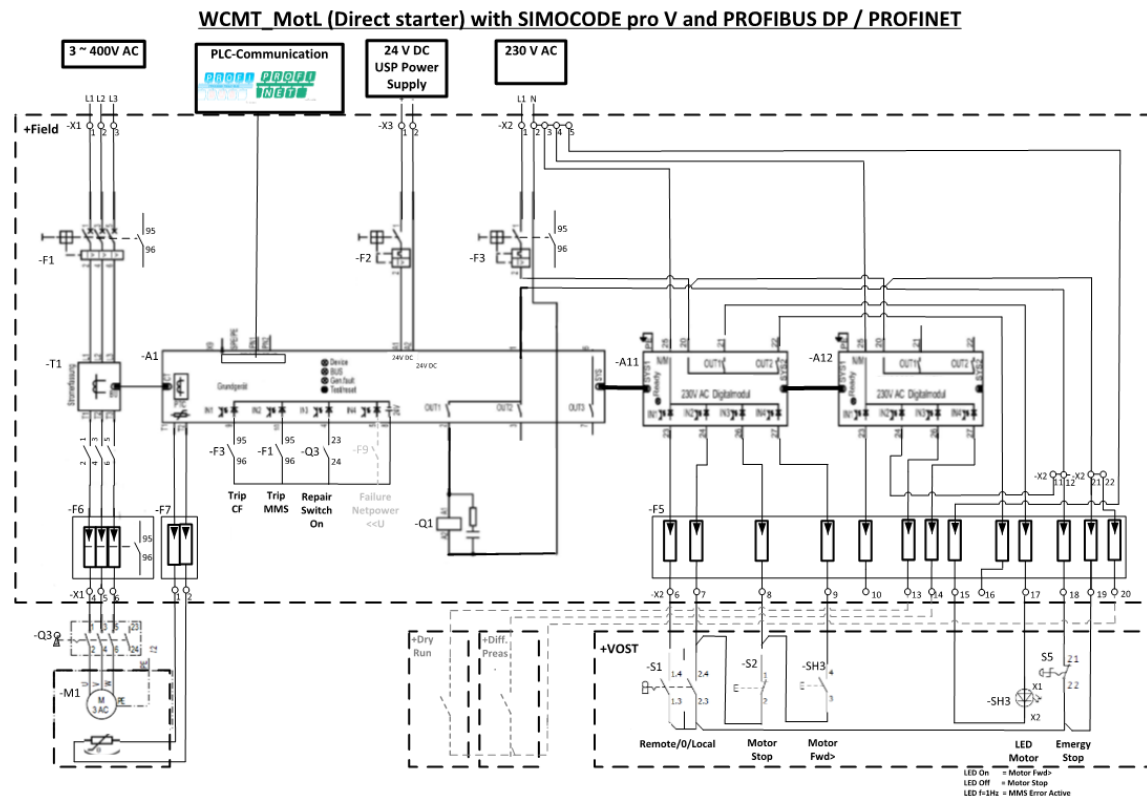
Figure 2-29



2.2.10 SIMOCODE pro V circuit diagram with PROFIBUS

The enclosed circuit diagram shows the hardware connection of the local on-site operation with PROFIBUS/PROFINET.

Figure 2-30 Direct starter



Local control is activated by means of the key-operated switch (-S1 Pos. 2). For maintenance and service work on the engine, the repair switch is handed over to the *MotL* as a *Maint* function to enable the drive.

The local local operation, after activation by a key switch (-S1), takes into account a switchover between local, device locked and remote (local / 0 / remote).

The drive is switched on or off via hardware from the connected control place of the SIMOCODE. If a fault occurs, SIMOCODE locks the drive. As soon as the fault is remedied and acknowledged, the drive interlock is released and the drive is ready to be switched on again.

2.2.11 WCMT_MotLean_FbMMS OS faceplates and symbols

Each control module type (WCMTs) of the PCS 7 Water Templates receives only one symbol on the OS for the technological core function, including the associated Panel icon if necessary (the latter is missing if the block is deselected or unavailable). The standard APL faceplates of *MotL* are used in *WCMT_MotLean_FbMMS* without changes.

Note

The used faceplates and symbols of the WCMT_MotLean_FbMMS are described in the corresponding profile. The profiles are part of this application example and you can obtain them from your regional sales partner.

In the section entitled [3 WCMT and WEMT profiles](#) you will find the description of a profile using an example.

Further information on the Standard PCS 7 OS faceplates and OS symbols can be found in the manual "SIMATIC Process Control System PCS 7 Advanced Process Library":
<https://support.industry.siemens.com/cs/ww/en/view/109750809>

2.2.12 WCMT_MotLean_FbMMS Panel faceplate/symbols

The Panel symbols and faceplates form part of the PCS 7 Industry Library and unlike the PCS 7 OS, they are not provided automatically for the individual control unit types (WCMTs) of the PCS 7 Water Templates. The user creates the plant-specific images for IPC/panel operation and monitoring separately via TIA Portal V14 SP1 Upd4.

Note

The used faceplates and symbols of the WCMT_MotLean_FbMMS are described in the corresponding profile. The profiles are part of this application example and you can obtain them from your regional sales partner.

In the section entitled [3 WCMT and WEMT profiles](#) you will find the description of a profile using an example.

For further information and configuration aids on the Panel integration, refer to the item: "Integration of Operator Panels in SIMATIC PCS 7 with the Industry Library"
<https://support.industry.siemens.com/cs/ww/en/view/50708061>
or the Industry Library manual for PCS 7:
<https://support.industry.siemens.com/cs/ww/en/view/109750809>

2.3 WCMT_MotSpdCon_FbDrv template

The template *WCMT_MotSpdCon_FbDrv* describes the connection between the SINAMICS G120 frequency inverters and automation with field bus connection (PROFIBUS DP). The processing of transmitting/receiving telegrams in automation occurs via the driver block *FbDrive* from the APL.

When comparing the templates *WCMT_MotSpdCon_FbDrv* and *WCMT_MotLean* from chapter 1.5, the CFCs only differ in sheet 1, sheet 4 and sheet 5. The blocks and links in sheet 2 and sheet 3 are functionally identical. The specific contents of *WCMT_MotSpdCon_FbDrv* are explained in detail in this section.

The standard hardware catalog in the HW Config provides the various device connections with the SINAMICS CU230P-2DP, including the telegram types 1 and 20 for connection via PROFIBUS DP. The *WCMT_MotSpdCon_FbDrv* only uses the telegram type 20. This telegram type is reserved by default for SINAMICS G120 in the HW catalog of SIMATIC Manager. Telegram type 1 is not described in connection with the *WCMT_MotSpdCon_FbDrv* templates.

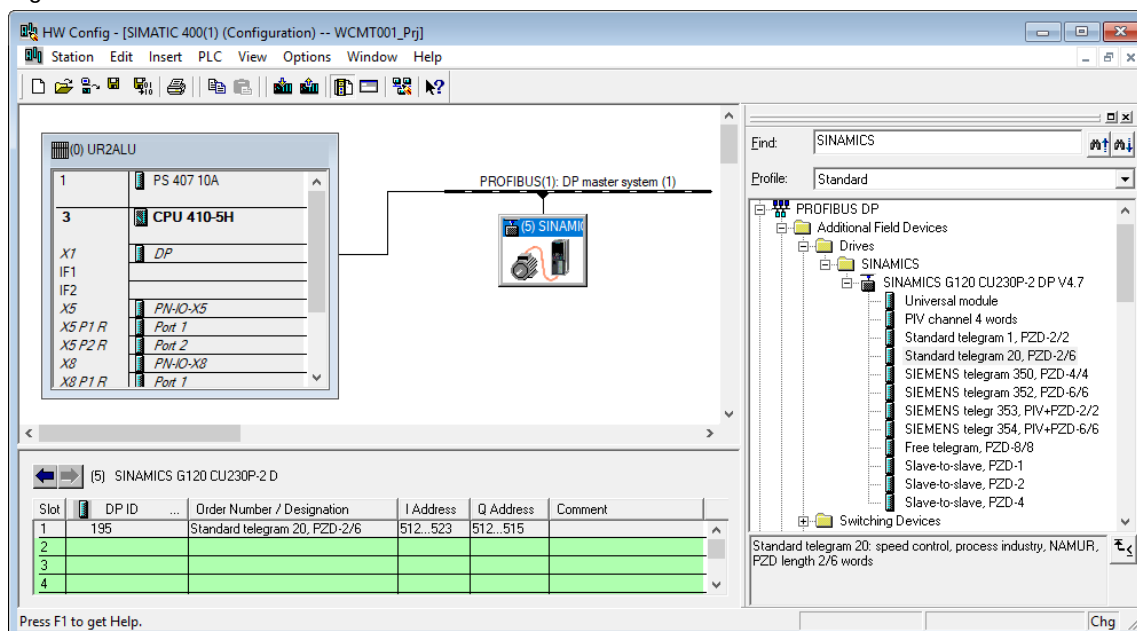
The configuration of the PROFINET communication with a SINAMICS G120 (P) and CU230P-2 PN is described in the following manual:

<https://support.industry.siemens.com/cs/ww/de/view/109757195>

The use of *WCMT_MotSpdCon_FbDrv* for SINAMICS G120 (P) for communication via PROFIBUS DP or PROFINET. In terms of hardware, these differ only in type CU230P-2 DP or CU230P-2 PN.

- CU230P-2 DP → PROFIBUS DP
- CU230P-2 PN → PROFINET

Figure 2-31



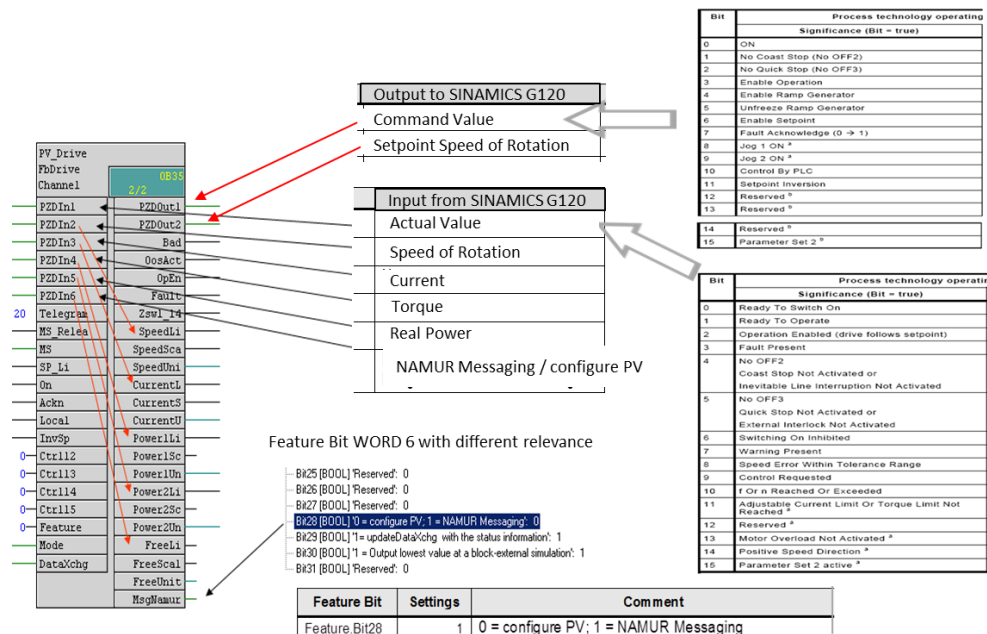
The following figure gives a schematic description of the input/output interfaces of SINAMICS G120 (P) and the channel block *FbDrive*. The telegram type 20 contains 6 input words and 2 output words, which are represented at the channel

block *FbDrive* by the inputs "PZDIn1" to "PZDIn6" and the outputs "PZDOut1" and "PZDOut2".

Input words:

- Input word "PZDIn1" = binary status messages from FI
- Input word "PZDIn2" = analog value for speed from FI (default %)
- Input word "PZDIn3" = analog value for engine current from FI (default %)
- Input word "PZDIn4" = analog value for torque from FI (default %)
- Input word "PZDIn5" = analog value for total active power from FI (default %)
- Input word "PZDIn6" = freely selectable analog value/digital input periphery D0...D5 or for Namur messages from the frequency inverter

Figure 2-32



By parameterizing of the feature bit 28 on driver block *FbDrive*, "PZDIn6" can either be used to transmit Namur messages or to transmit another freely selectable analog value/digital input values D0 ... D5. The selection is made via feature bit 28 (signal =0) on the driver block *FbDrive*. The Feature bit assignment is shown in following table:

Table 2-7

Feature bit	Settings	Comment
Feature.Bit28	0	Bit = 0: Messages are freely configurable and read as PV Bit = 1: Messages are read as MsgNamur
Feature.Bit29	1	Bit = 0: No transmission of information Bit = 1: Transmission and message to the primary diagnostics block

Feature bit	Settings	Comment
Feature.Bit30	1	Bit = 0: If an input parameter has the simulation value 16#60, the value 16#0000 is given out at the output parameter "PZDOut1". <i>Bit = 1: If an input parameter has the simulation value 16#60, the value is written to the field device.</i>

Italics = default setting

The table shows the arrangement of NAMUR messages in the input word PZDIn6:

Table 2-8

Bit	Signal name	0 signal	1 signal
00	Fault in the frequency inverter information electronics/SW error	No	Yes
01	Power system fault	No	Yes
02	DC-link overvoltage	No	Yes
03	Inverter power electronics fault	No	Yes
04	Power inverter temperature rise	No	Yes
05	Ground fault	No	Yes
06	Engine overload	No	Yes
07	Bus fault	No	Yes
08	External safety shutdown	No	Yes
09	Error engine encoder	No	Yes
10	Internal communication fault	No	Yes
11	Incoming unit fault	No	Yes
15	Other faults/errors	No	Yes

NOTE

If the additional NAMUR messages are used in the FbDrive (feature bit 28 = 1), the messages provided at the "MsgNamur" conversion block (W_BO) must subsequently be interconnected by the user.

The tables indicate the configuration of an arbitrary analog value, for example a motor temperature, or a wiring of the digital periphery DI0 ... DI5 for a local control station with input word PZDI6:

Tabelle 2-9

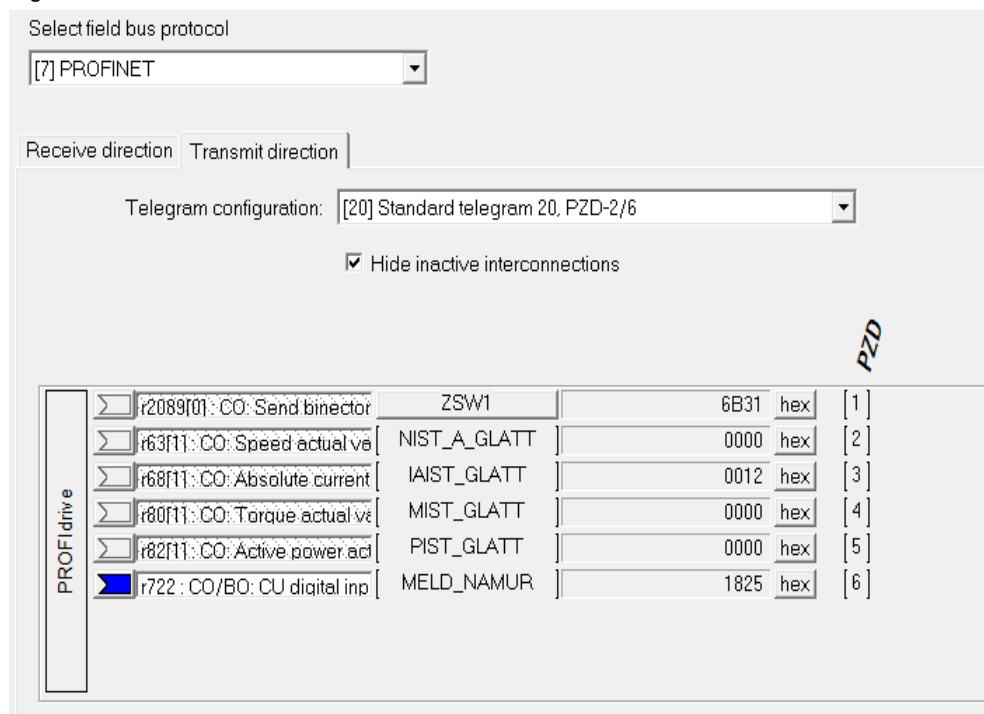
WORD	Signal name	Measuring range	Unit
PEW	Motor temperature	0.0 ... 150.0	°C

Tabelle 2-10

Bit	Signal name	0 Signal	1 Signal
0	D0 = Maintenance switch	Off	On
1	D1 = Local HW	Off	On
2	D2 = Remote HW	Off	On
3	D3 = Button motor stop	Bad	Good
4	D4 = Feedback (Fwd >)	Off	On
5	D5 = Tripping motor protection or emergency stop	Bad	Good
6	Not used	-	-
7	Not used	-	-

For further processing of the SINAMICS G120 (P) digital input periphery, the "r722" index must be parameterized for the telegram 20 / PZE 6 via the STARTER tool in the fieldbus area.

Figure 2-33



The binary transmission of commands and analog setpoint specification of the automation are transferred from the automation system to the SINAMICS via the output values "PZD Out1" and "PZDOut2".

Output words:

- Output word "PZDOut1" = binary commands to the frequency inverter
- Output word "PZDOut2" = rotational speed setpoint value specification to the frequency inverter

Note

For further information about the configuration of frequency inverters, refer to the following links:

Configuration with the APL Channel Block "FbDrive" in SIMATIC PCS 7

<https://support.industry.siemens.com/cs/ww/en/view/64181993>

Configuration of SINAMICS / MICROMASTER Drives with Drive ES in SIMATIC PCS 7

<https://support.industry.siemens.com/cs/ww/en/view/58007228>

Getting Started SINAMICS G120 converter with Control Units CU230P-2; CU240B-2; CU240E-2

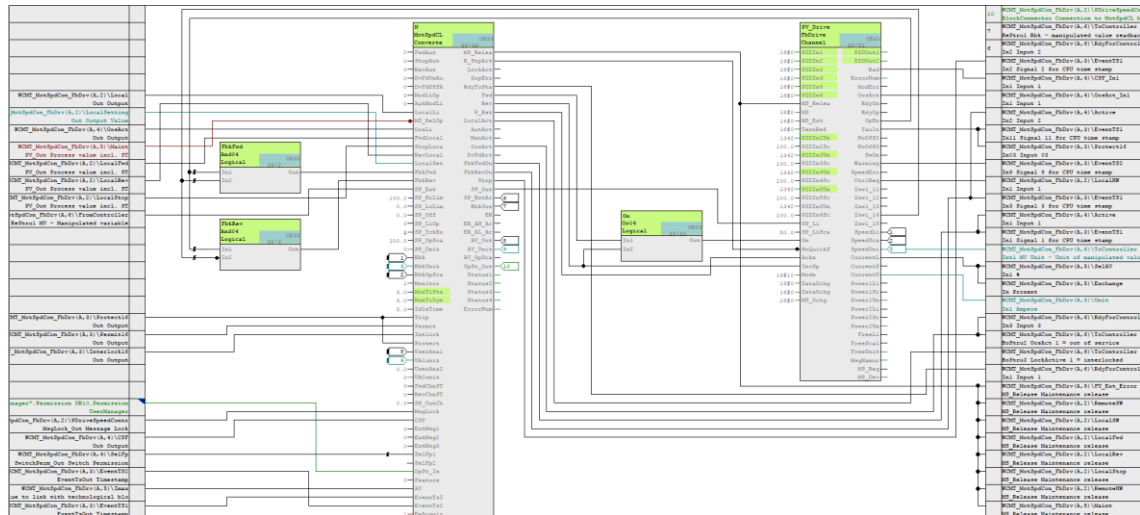
<https://support.industry.siemens.com/cs/ww/en/view/94003665>

SINAMICS G120 inverters with CU240B-2 and CU240E-2 Control Units

<https://support.industry.siemens.com/cs/ww/en/view/109744796>

2.3.1 CFC subplan A sheet 1

Figure 2-34



In subplan A sheet 1, the *WCMT_MotSpdCon_FbDrv* provides a SINAMICS G120(P) frequency inverter with two directions of rotation via one APL field bus driver block *FbDrive*. Here, the driver block supplies/removes the *MotSpdCL* cyclically via Send and Receive Telegrams with SINAMICS G120(P). The template *WCMT_MotSpdCon_FbDrv* differs in two essential points from the *WCMT_MotLean*:

1. Technological core functions, including field bus connection (PROFIBUS DP/PROFINET)
2. Operating hours counter based on the direction of rotation
3. Collective fault instead of classified fault messages
4. Scaling of motor current % to ampere
5. Preconfigured connection to the WEMT_Aggr08

The *FbDrive* provided in PCS 7 automatically connects to the device type configured in the HW Config throughout the compiling process. This requires the activation of the compiler option "generate with block drivers".

NOTE

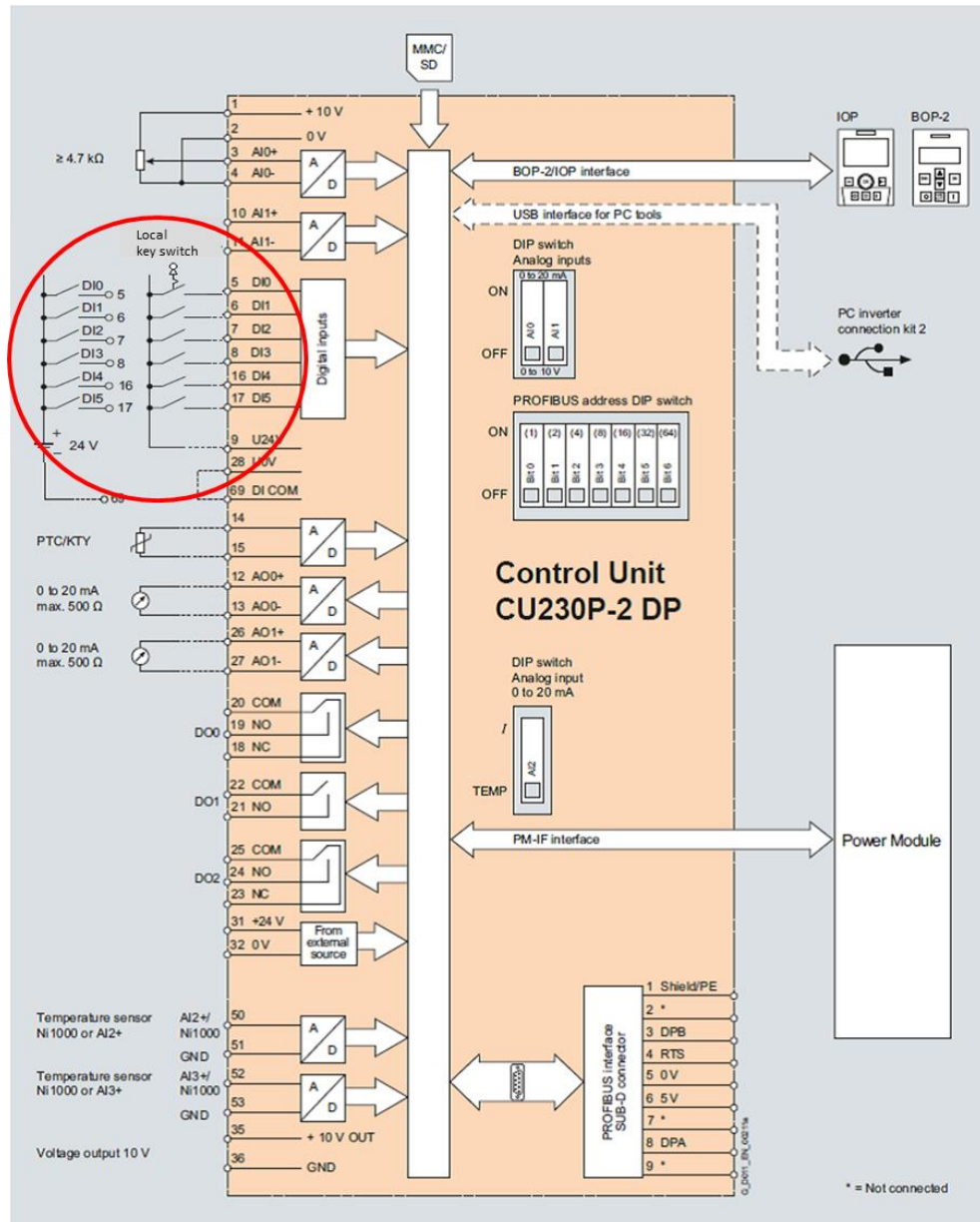
In the HW Config, the same number for PEW and PAW (for example, PEW 512 and PAW 512) is required for the assignment of the I / O address in the CFC during address assignment.

The *FbDrive* provides four analog values with the telegram type 20 from the frequency inverter via the outputs of *FbDrive*. The analog value for the rotational speed feedback is given out via the "SpeedLi" output. This is connected directly to the "Fkb" input of *MotSpdCL*.

The *FbDrive* transfers the engine current to the "*CurrentLi*" output of the *Exchange* block of subplan A sheet 5. Further processing is described in detail in chapter [2.2.5 CFC subplan A sheet 5](#).

The torque and active power of the frequency inverter are transferred directly from the PCS 7 driver block *FbDrive* via the outputs "*Power1Li*" or "*Power2Li*" to "*UserAna1*" or "*UserAna2*" of *MotSpdCL*. Both values incl. units are provided in the PCS 7 OS, in the standard view of *MotSpdCL*.

Figure 2-35



The operator functions for Automatic, Manual and Local Control (Local SW and LocalHW) have the exact same software as those in the CFC in chapter [2.2.1](#) and [2.2.2](#).

Only the external hardware configuration on SINAMICS G120 differs from the hardware concept in chapter [2.1.2](#) in the fact that the frequency inverter provides

2.3.2 CFC subplan A sheet 2

Figure 2-36

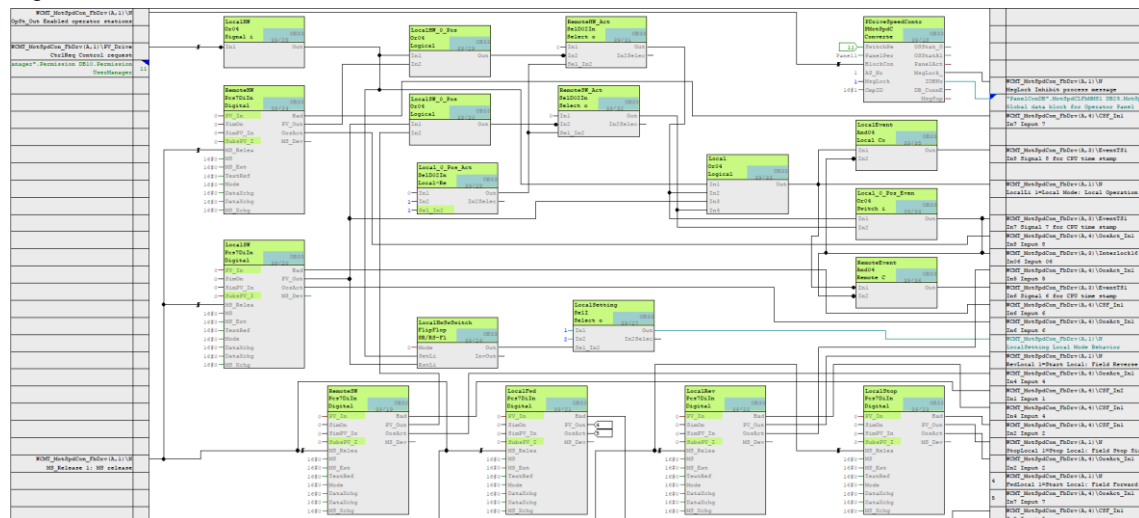
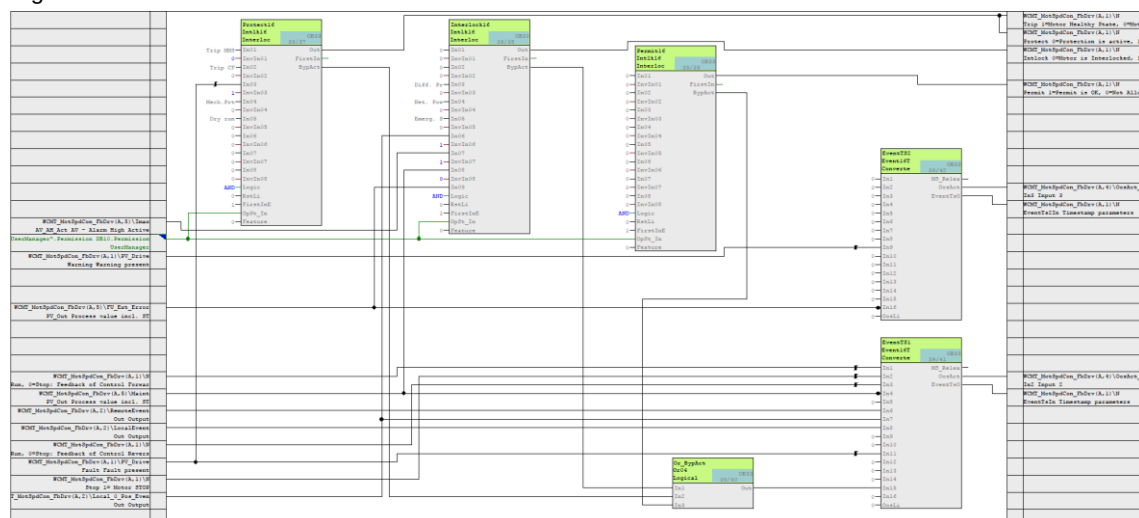


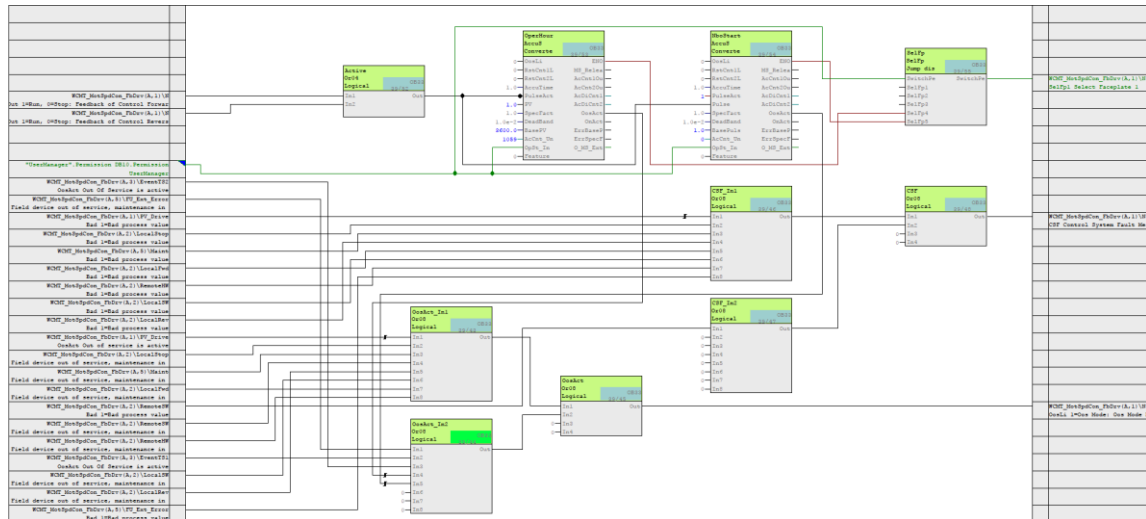
Figure 2-37



2.3.4 CFC subplan A sheet 4

The description corresponds to that of the WCMT_MotLean. Further information can be found in section: [2.1.4 CFC subplan A/sheet 4](#).

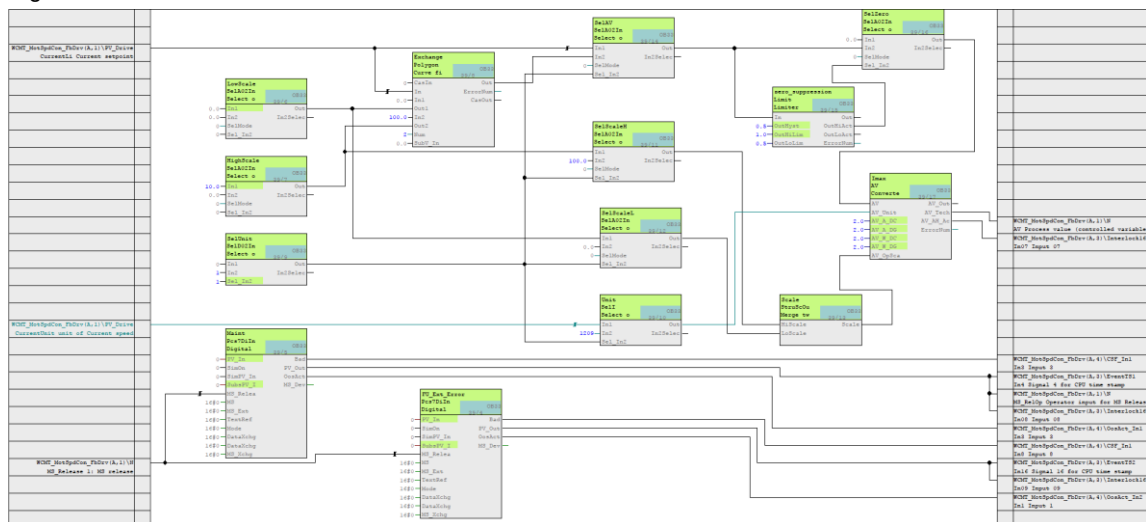
Figure 2-38



2.3.5 CFC subplan A sheet 5

In subplan A sheet 5 of WCMT_MotSpdCL_FbDrv, further processing resumes in the *Exchange* block of the interconnected "Engine current" of the PCS 7 FbDrive driver block.

Figure 2-39



A programmable delay time suppresses an alarm message in case of a short-term exceeding of I_{max} (chatter suppression). If this time is exceeded and simultaneous value $> I_{max}$, an alarm message is generated.

An additional zero-point suppression can also be activated as an offset (0.0 A). The offset suppresses a measured-value drift < 0.0 A. This function is optional and can be configured according to the plant or removed in the WCMT.

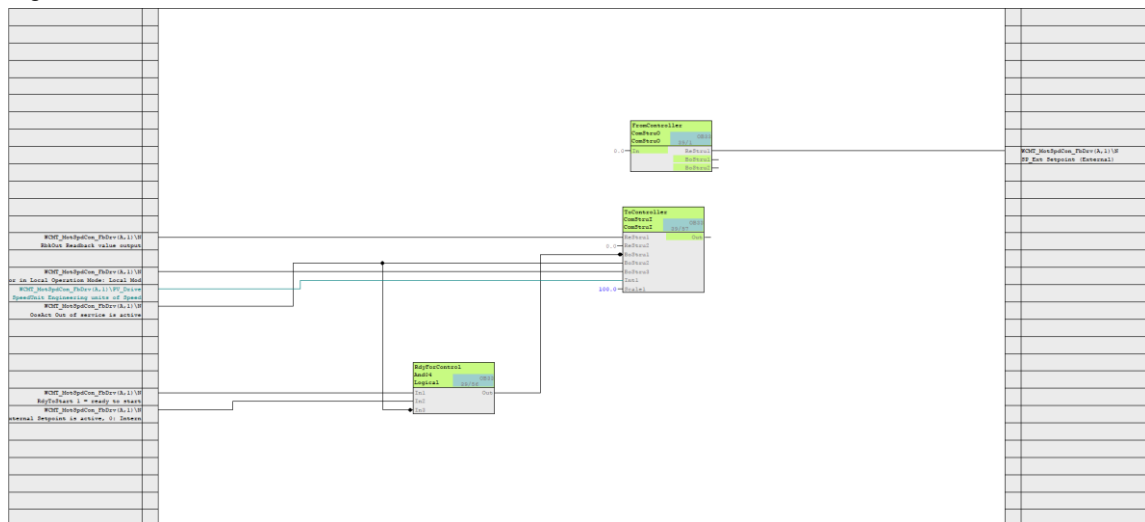
In the *WCMT_MotSpdCL_FbDrv* subplan A sheet 1, the engine current is interconnected with the *MotSpdCL* via "AV". An additional Limit View is provided in the *MotSpdCL* on the PCS 7 OS. Measuring range start/finish and four configurable limits are additionally available to enable the user to perform operation and monitoring of the engine current.

2.3.6 CFC subplan A sheet 6

The PCS 7 Water Templates keep the range ready for further communication enhancements in all subplans A sheet 6. This subplan is conceptually ready for local data exchange, serial connections or remote control technology. In the case of controller, engine slide units and frequency inverters, prefabricated switching units are provided, interconnected with one connection by means of a quick tailor-made connection (plug and coupling). This pre-configured variant can be extended at any time in a task-specific manner.

This pre-configured variant can be extended at any time for a specific project and is intended for fast connection to a *WEMT_Aggr08*.

Figure 2-40



2.3.7 WCMT_MotSpdCon_FbDrv OS faceplates and symbols

Each control module type (WCMTs) of the PCS 7 Water Templates receives only one symbol on the OS for the technological core function, including the associated Panel icon if necessary (the latter is missing if the block is deselected or unavailable). The standard APL faceplates of *MotSpdC* are used in *WCMT_MotSpdCon_FbDrv* without changes.

Note

The used faceplates and symbols of the *WCMT_MotSpdCon_FbDrv* are described in the corresponding profile. The profiles are part of this application example and you can obtain them from your regional sales partner.

In the section entitled [3 WCMT and WEMT profiles](#) you will find the description of a profile using an example.

Further information on the Standard PCS 7 OS faceplates and OS symbols can be found in the manual "SIMATIC Process Control System PCS 7 Advanced Process Library":

<https://support.industry.siemens.com/cs/ww/en/view/109750809>

2.3.8 WCMT_MotSpdCon_FbDrv Panel faceplate/symbols

The panel symbols and faceplates form part of the PCS 7 Industry Library and unlike the PCS 7 OS, they are not provided automatically for the individual control unit types (WCMTs) of the PCS 7 Water templates. The user creates the plant-specific images for Panel/IPC operation and monitoring separately via TIA Portal V14 SP1 Upd4.

Note

The used faceplates and symbols of the *WCMT_MotSpdCon_FbDrv* are described in the corresponding profile. The profiles are part of this application example and you can obtain them from your regional sales partner.

In the section entitled [3 WCMT and WEMT profiles](#) you will find the description of a profile using an example.

For further information and configuration aids on the Panel integration, refer to the item: "Integration of Operator Panels in SIMATIC PCS 7 with the Industry Library"

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

or the Industry Library manual for PCS 7:

<https://support.industry.siemens.com/cs/ww/en/view/109750809>

2.4 WCMT_SitransMAG6000_Fb template

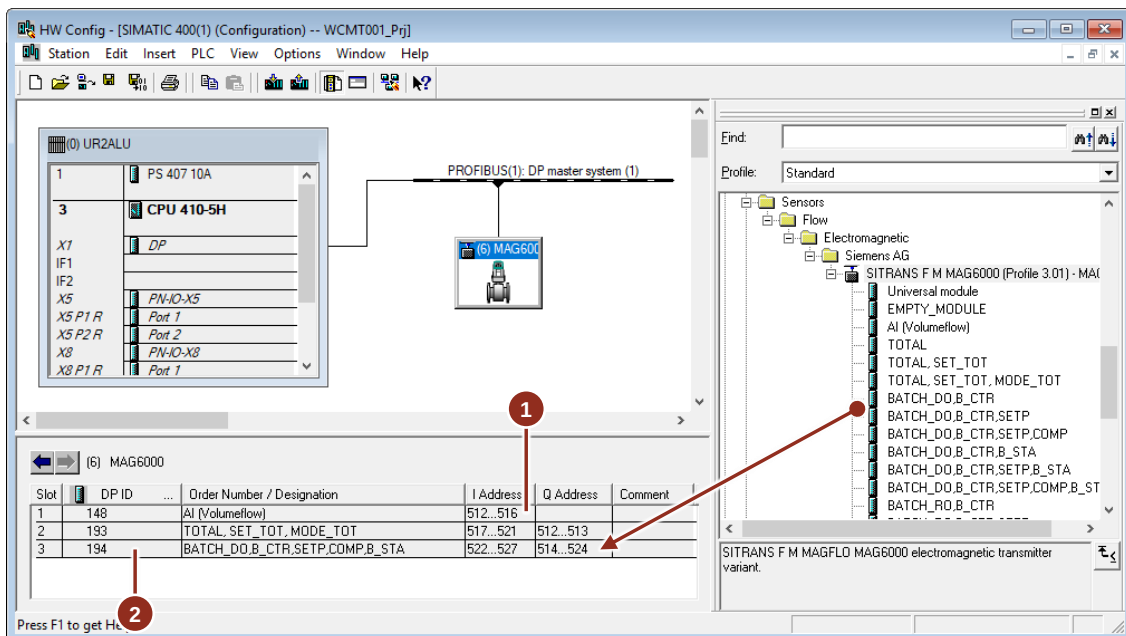
The PCS 7 Water Template *WCMT_SitransMAG6000_Fb* provides descriptions of a flow transmitter, type SITRANS MAG 6000 with field bus connection. PROFIBUS DP allows the connection of transmitters and automation systems (AS). Data supply and deletion is carried out in the automation system by means of a block *FbMag6T* from the SITRANS Library, which conforms to APL.

When compared to the above-described basic concept of *WCMT_MotLean_FbMMS*, the *WCMT_SitransMAG6000_Fb* differs in some points in the subplan A sheet 1..4.

The following figure shows the standard hardware catalog in HW Config. The path shown identifies the device selection for connecting the MAG6000 via PROFIBUS DP to the AS.

Cyclic data is configured in the HW Config. These determine the type of CFC function block and associated faceplate simultaneously.

Figure 2-41



- (1) Address for addressing in the CFC
- (2) Configuration of cyclic data (flow, counter 1, dosing, counter 2)

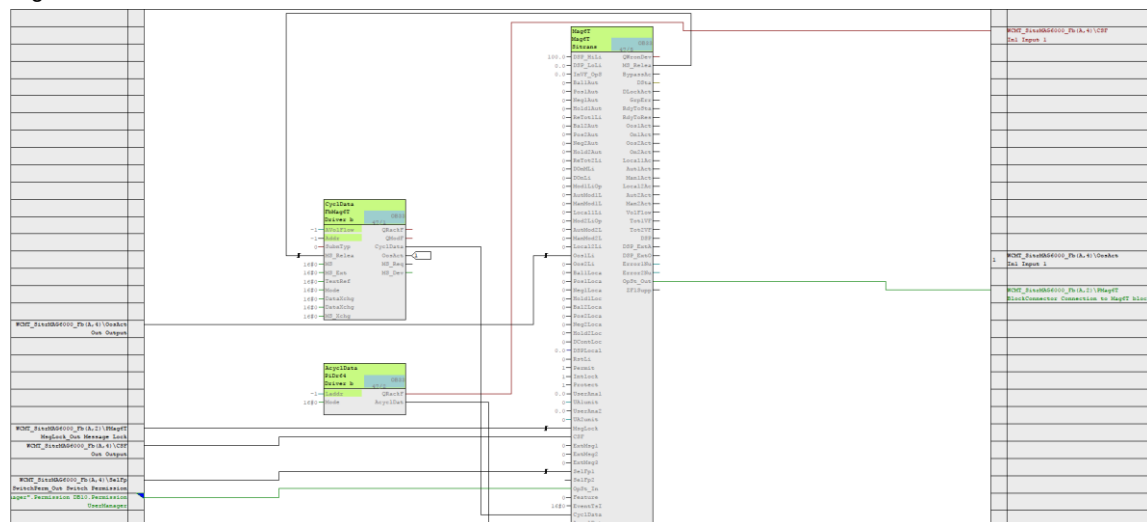
2.4.1 CFC subplan A sheet 1

The *FbMag6T* SITRANS Library unites the driver block and analog monitoring into one block. The assignment of Feature bit parameters enables the user to select the desired function, e.g. with two independent counters or flow with a single counter and a single dosing.

The block interconnection is exemplarily prepared in the *WCMT_SitransMAG6000_Fb* template. In the project, the user only specifies the functions depending on the specific task. Once a PCS 7 OS compilation is carried out at a later stage, the faceplates will be available, ready for operator control and monitoring, depending on the above mentioned function selection. Cyclic and acyclic data is transmitted in the *WCMT_SitransMAG6000_Fb* template between the MAG6000 flowmeter and the automation system via PROFIBUS DP. APL compliant representations of *FbMag6T* are also available:

1. Operating modes
 - in progress/out of service
 - Automatic/Manual
2. APL or IL based multi-user concept (with Panel connection, if required)
3. Startup characteristics after system start, e.g.
 - Exit active dosing: Yes/No
 - Re-read configuration data (e.g. units, limit values): Yes/No
4. Resetting of interlocks
5. Suppression of messages

Figure 2-42



Note

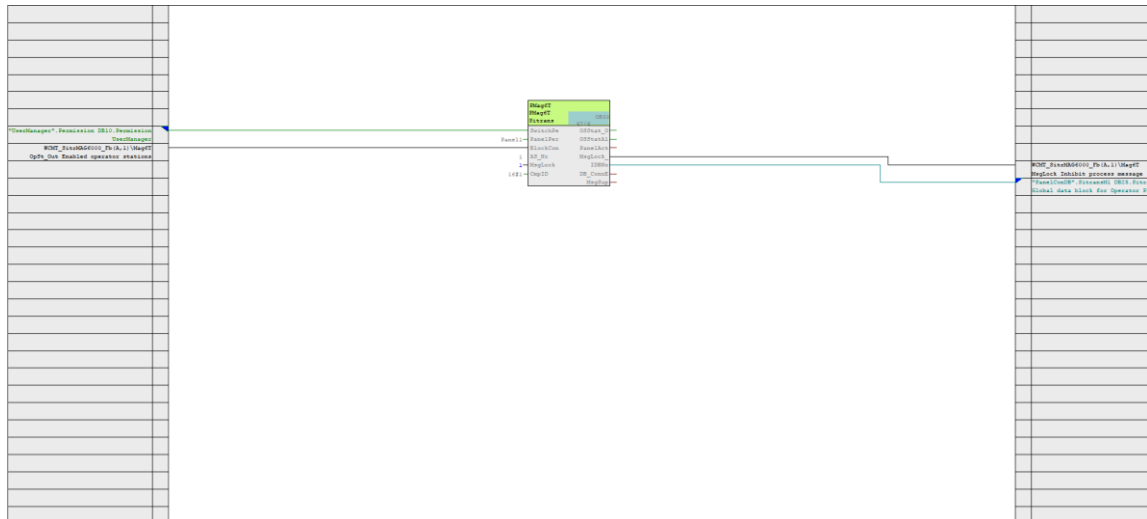
For more information, see the SITRANS Library manual at the following link:

<https://support.industry.siemens.com/cs/ww/en/view/109759904>

2.4.2 CFC subplan A sheet 2

The following subplan A sheet 2 provides the additional panel operation for a local monitoring with software connection.

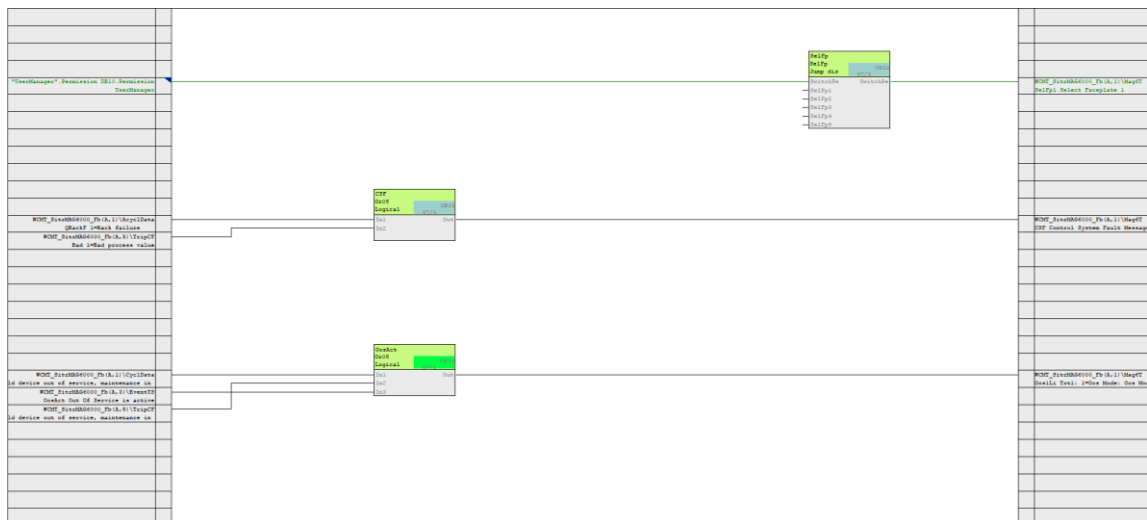
Figure 2-43



2.4.3 CFC subplan A sheet 4

The jump distributor SelfP is identical with the solution ides WCMT_MotLean. Further information can be found in section: [2.1.4 CFC subplan A/sheet 4](#).

Figure 2-44



2.4.4 CFC subplan A sheet 3, sheet 5 and sheet 6

CFCs sheets 3, 5 and 6 are provided to the user as a backup.

2.4.5 WCMT_SitransMAG6000_Fb OS faceplates and symbols

Each control module type (WCMTs) of the PCS 7 Water Templates receives only one symbol on the OS for the technological core function, including the associated Panel icon if necessary (the latter is missing if the block is deselected or unavailable). The standard APL faceplates of *SitransMAG6000* are used in *WCMT_SitransMAG6000* without changes.

Note

The used faceplates and symbols of the WCMT_SitransMAG6000_Fb are described in the corresponding profile. The profiles are part of this application example and you can obtain them from your regional sales partner.

In the section entitled [3 WCMT and WEMT profiles](#) you will find the description of a profile using an example.

Further information on the Standard PCS 7 OS faceplates and OS symbols can be found in the manual "SIMATIC Process Control System PCS 7 Advanced Process Library":
<https://support.industry.siemens.com/cs/ww/en/view/109750809>

2.4.6 WCMT_SitransMAG6000_Fb Panel faceplates/symbols

The panel symbols and faceplates form part of the PCS 7 Industry Library and unlike the PCS 7 OS, they are not provided automatically for the individual control unit types (WCMTs) of the PCS 7 Water templates. The user creates the plant-specific images for Panel/IPC operation and monitoring separately via TIA Portal V14 SP1 Upd4.

Note

The used faceplates and symbols of the WCMT_SitransMAG6000_Fb are described in the corresponding profile. The profiles are part of this application example and you can obtain them from your regional sales partner.

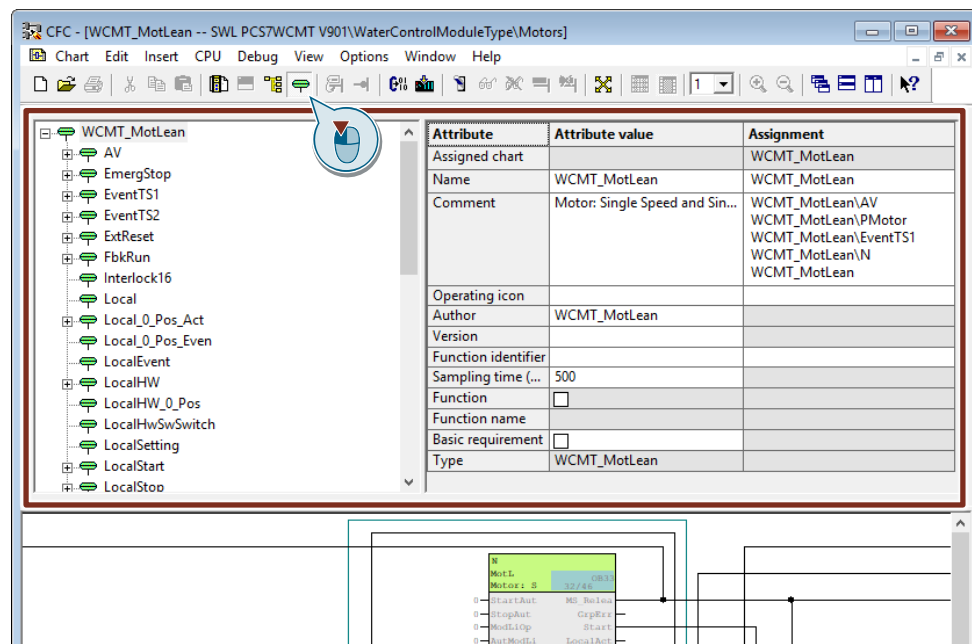
In the section entitled [3 WCMT and WEMT profiles](#) you will find the description of a profile using an example.

For further information and configuration aids on the Panel integration, refer to the item: "Integration of Operator Panels in SIMATIC PCS 7 with the Industry Library"
<https://support.industry.siemens.com/cs/ww/en/view/50708061>
or the Industry Library manual for PCS 7:
<https://support.industry.siemens.com/cs/ww/en/view/109750809>

2.5 WCMT use with PCS 7/PCS 7 Plant Automation Accelerator/COMOS

The Water Control Module Types (WCMTs) are appropriate for use with PCS 7, PCS 7 Plant Automation Accelerator or COMOS. The optional connection and disconnection of the variants is made via the technological connections. At the same time, via this interface the data exchange with the PCS 7 Plant Automation Accelerator or COMOS takes place.

Figure 2-45



In the corresponding WCMT profiles you will find tables describing which blocks are used in the WCMT and which blocks are optional.

2.5.1 Use with PCS 7 Plant Automation Accelerator/COMOS

For further information about use with PCS 7 Automation Accelerator/COMOS, please refer to the manuals for the PCS 7 planning tools of Plant Automation Accelerator/COMOS.

You can also find an Application Example with a detailed description regarding use with COMOS:

<https://support.industry.siemens.com/cs/ww/en/view/70922226>

3 WCMT and WEMT profiles

WCMT and WEMT profiles perform a variety of functions and tasks in the description of the PCS 7 Water Templates. The profiles contain the following information on the associated WCMT and WEMT, which are structured in the following sections:

1. Functional description
(Function, Variants, Statuses, Command types, ...)
2. Design specification
(parameters, inputs, outputs, messages, ...)
3. CFC charts
4. Circuit Diagrams

You can use the profiles for various applications such as invitations to tender, requirement specifications, requirement specifications, system documentation or for commissioning.

You will find all profiles for the individual control unit types in the Zip archive "Water_Templates_PCS7_Steckbriefe_V901_en.zip". The profiles are available in "PDF" file format. The profiles are provided free of charge via your regional Siemens sales partner.

https://w3.siemens.com/aspa_app/?lang=en

In the following, the profiles are explained using the example of "WCMT_MotLean_FbMMS_V901".

3.1 Functional description

In section 1 "FUNCTIONAL DESCRIPTION" of the PROFILE, the following topics are described in the corresponding sub-sections:

Section	Title
1	Functional description
1.1	Introduction
1.2	Variants list
1.3	States
1.4	Operating modes
1.5	States of emergency
1.6	Startup characteristics
1.7	Miscellaneous

3.1.1 Introduction

The introduction contains a short description of how to use WCMT.

Figure 3-1

<p>1.1 INTRODUCTION</p> <p>WCMT_MotLean_FbMMS is used for the control of motors with one control signal using SIMOCODE.</p>
--

3.1.2 Variants list

Optional variants are available for the water-specific individual control unit types so that you can select the range of functions as required. The functional range of the variants is described in this section.

Figure 3-2

<p>1.2 VARIANTS LIST</p> <p>This chapter describes input and output parameters, interfaces to other modules, statuses and commands.</p> <ul style="list-style-type: none"> • WCMT_MotLean_FbMMS <p>With all blocks.</p> <ul style="list-style-type: none"> • WCMT_MotLean_FbMMS#1 <p>Only technological block + SIMOCODE driver.</p> <ul style="list-style-type: none"> • WCMT_MotLean_FbMMS#2 <p>Technological block with input/output drivers, messaging via EventTS; interlock functions and faceplate selector.</p> <p>Table 1.2.1 Variants list</p>						
Signal				CMT variant		
Block/ Name	Description	Data type	Input / Output	WCMT_MotLean_FbMMS	WCMT_MotLean_FbMMS#1	WCMT_MotLean_FbMMS#2
LocalSW						
PV_In	Input value	BOOL	IN	X		X
LocalStart						
PV_In	Input value	BOOL	IN	X		X
LocalStop						
PV_In	Input value	BOOL	IN	X		X
PV_Switch_MMS						
PZDIn1	Input word 1	REAL	IN	X		
PZDIn2	Input word 2	REAL	IN	X		
PZDOut1	Output word 1	REAL	OUT	X		
RemoteSW						
PV_In	Input value	BOOL	IN	X		X

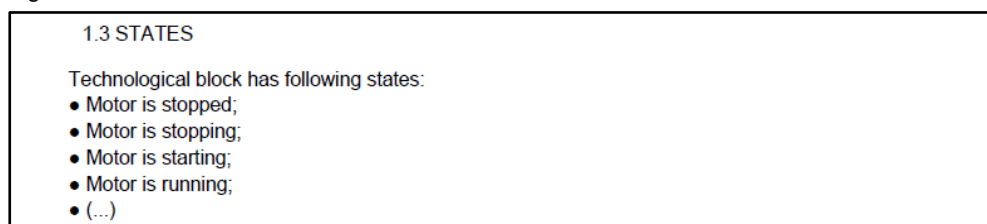
Note

The variants of S7_WCMT were stored in COMOS/PAA and generated automatically during instantiation in PCS 7. To configure the WCMT variants without COMOS/PAA in PCS 7, you must activate/deactivate all optional connections of the required variant in the technological connections for each instance. Use the configuration table from the profiles. In addition, you can create your own project-related variants from the WCMT by activating or deactivating further options.

3.1.3 States

This section describes the essential states of the technological module.

Figure 3-3



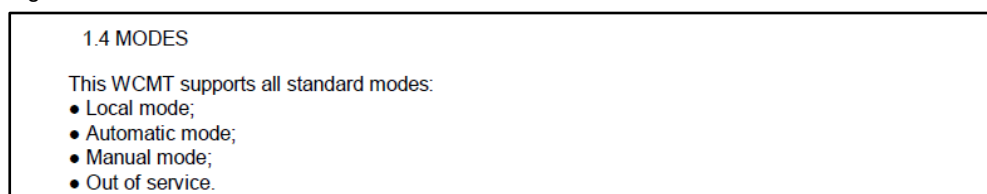
Further information regarding the states of the technological blocks can be found in the manual "SIMATIC Process Control System PCS 7 Advanced Process Library (V9.0 SP1)":

<https://support.industry.siemens.com/cs/ww/en/view/109754967>

3.1.4 Command mode

This section describes the operating modes of the WCMT.

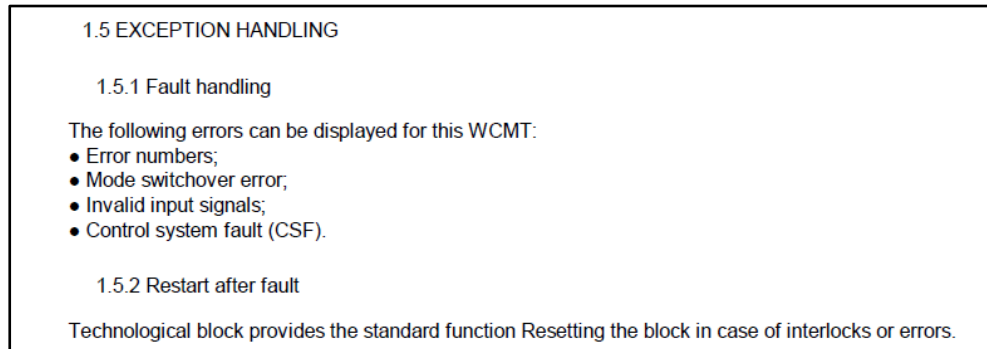
Figure 3-4



3.1.5 States of emergency

This section deals with the states in the event of an error. There are the subchapters "Error behavior" and "Restart after error".

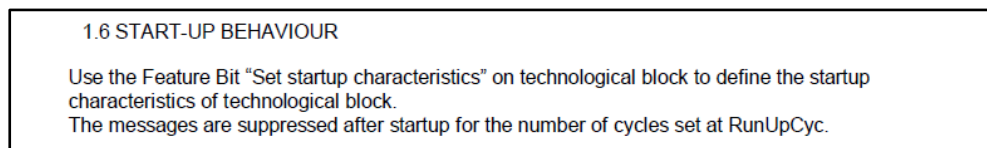
Figure 3-5



3.1.6 Startup characteristics

This section contains information on the start-up behavior of the technological module.

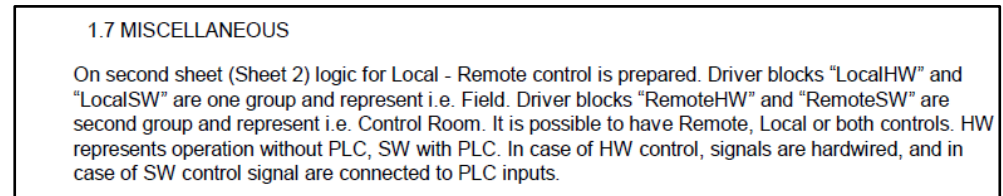
Figure 3-6



3.1.7 Interlock

The section "Miscellaneous" contains information on which process values and process signals are connected via digital or analog driver modules and an overview of the interlocks (with and without acknowledgement) for the PROTECT and INTERLOCK modules.

Figure 3-7



Note

The interlocks connected to the "PROTECT" and "INTERLOCK" blocks are exemplary and can be adapted project-specifically in the master data library of the WCMT.

3.2 Design specification

In the section "Design Specification" of the profile all parameters, inputs, outputs, interfaces and messages of the single control module type are listed. The presentation is in tabular form. The section is divided into the following sub-sections:

Section	Title
2	Design specification
2.1	Parameters
2.2	Inputs
2.3	Outputs
2.4	Interface to other modules
2.5	Messages
2.6	Visualization

3.2.1 Parameters

Any existing parameters are listed in this section.

Figure 3-8

2.1 PARAMETERS
<<None>>

3.2.2 Inputs

All input connections of the WCMT and their assignment to the individual variants are described in this section.

Figure 3-9

2.2 INPUTS						
Table 2.2.1 Inputs						
Parameter				CMT variant		
Block/ Name	Description	Data type	Default value	WCMT_McLean_FMMMS	WCMT_McLean_FMMGHT	WCMT_McLean_FMMGSEZ
LocalSW						
SubsPV_In	Substitution value	BOOL	false	X		X
LocalStart						
SubsPV_In	Substitution value	BOOL	false	X		X
LocalStop						
SubsPV_In	Substitution value	BOOL	false	X		X
Local_0_Pos_Act						
Sel_In2	0: Out =In1:Local-Remote; 1: Out =In2:Local-0-Remote	BOOL	true	X		X
MotorCurrent						
AV_A_DC	AV Alarm Delay Time Coming [s]	REAL	2.0	X		
AV_A_DG	AV Alarm Delay Time Going [s]	REAL	2.0	X		
AV_W_DC	AV Warning Delay Time Coming [s]	REAL	2.0	X		
AV_W_DG	AV Warning Delay Time Going [s]	REAL	2.0	X		
HiScale	Ampere	REAL	10.0	X		
LoScale	Ampere	REAL	0.0	X		
OutHiLim	Out value High limit	REAL	1.0	X		
OutHyst	Hysteresis	REAL	0.5	X		
Unit	0: Out = In1 (%); 1: Out =In2 (A)	BOOL	true	X		
N						
MonTiDynamic	Monitoring Time of Feedback on starting or on change in control output [s]	REAL	3.0	X	X	X
MonTiStatic	Monitoring Time of Feedback [s]	REAL	3.0	X	X	X
RemoteSW						
SubsPV_In	Substitution value	BOOL	false	X		X

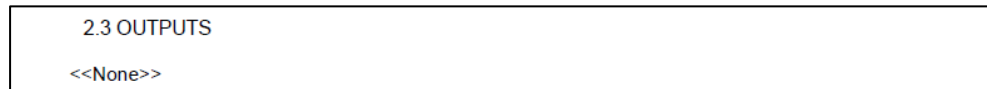
Note

The WCMT variants were stored in COMOS/PAA and automatically generated during instantiation in PCS 7. To configure the WCMT variants without COMOS/PAA in PCS 7, you must activate/deactivate all optional connections of the required variant in the technological connections for each instance. Use the configuration table from the profiles. In addition, you can create your own project-related variants from the WCMT by activating or deactivating further options.

3.2.3 Outputs

If there are output connections on the WCMT, these and their assignment to the individual variants are described in this chapter.

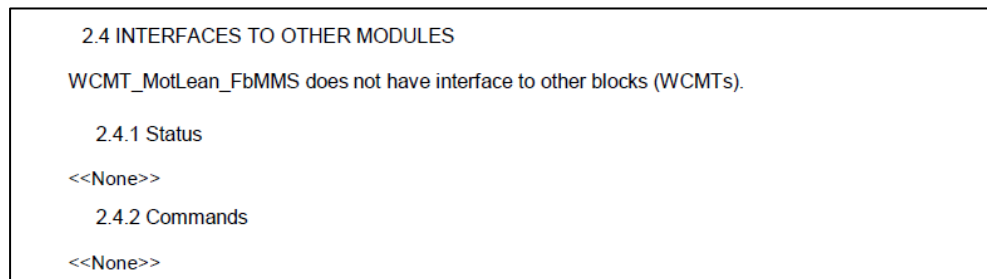
Figure 3-10



3.2.4 Interface to other modules

Any existing interfaces are listed in this chapter.

Figure 3-11



3.2.5 Messages

In this section, all operating and fault messages are listed in tabular form which can be triggered by the WCMT signal modules (depending on the selected variant).

Figure 3-12

2.5 MESSAGES				
Table 2.5.1 Messages				
Message				CMT variant
Block/ Name	Message class	Event	Prio	
EventTS1				
MsgEvid1_SIG1	Status message - PLC	\$\$BlockComment\$\$ Motor On	0	X
MsgEvid1_SIG2	Status message - PLC	\$\$BlockComment\$\$ Motor Off	0	X
MsgEvid1_SIG3	Status message - PLC	\$\$BlockComment\$\$ Reserve	0	X
MsgEvid1_SIG4	Operating message - standard	\$\$BlockComment\$\$ Temporary Locked	0	X
MsgEvid1_SIG5	Operating message - standard	\$\$BlockComment\$\$ Ext. Reset	0	X
MsgEvid1_SIG6	Operating message - standard	\$\$BlockComment\$\$ Remote	0	X
MsgEvid1_SIG7	Operating message - standard	\$\$BlockComment\$\$ Local Locked	0	X
MsgEvid1_SIG8	Operating message - standard	\$\$BlockComment\$\$ Local	0	X

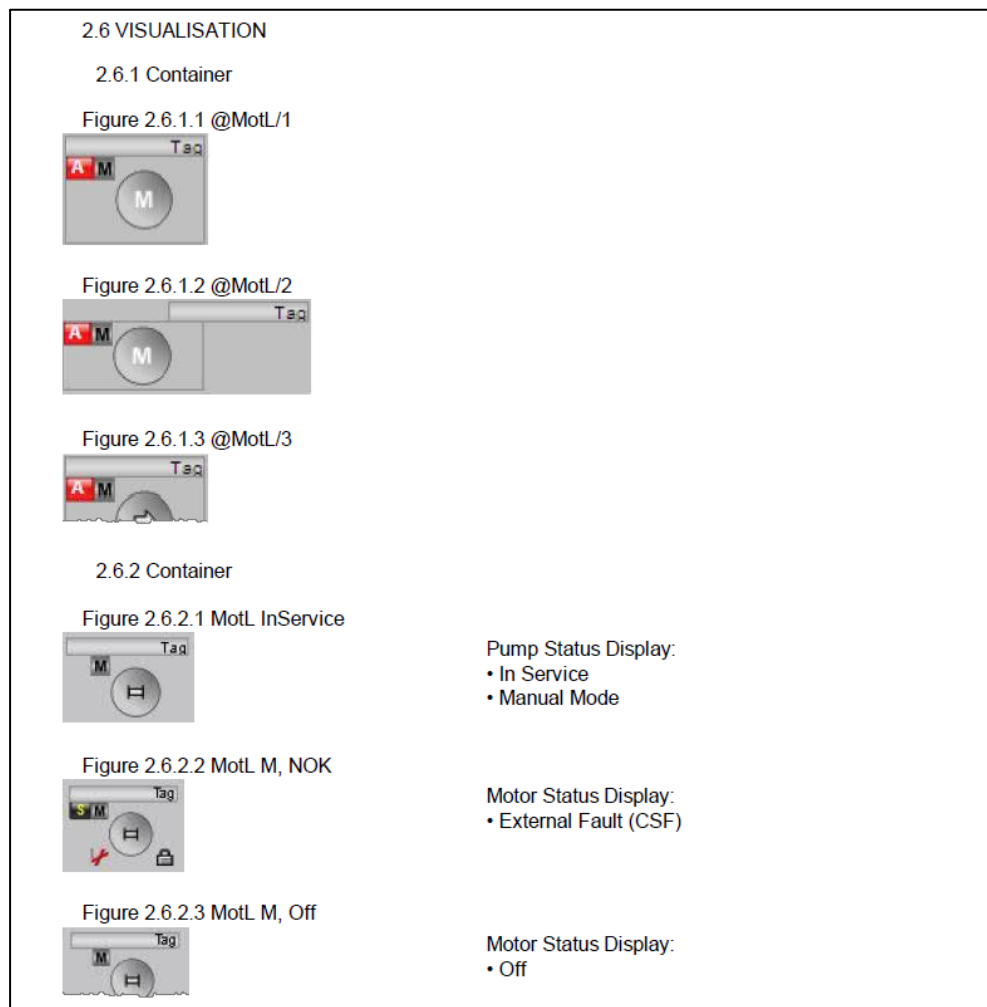
3.2.6 Visualization

In the section "Visualization" you will find an overview of symbols and faceplates (image modules) of the technological module for display on the operator station or a Comfort Panel.

Symbols

The subsection "Symbols" lists the configurable block symbols and the optional panel symbol.

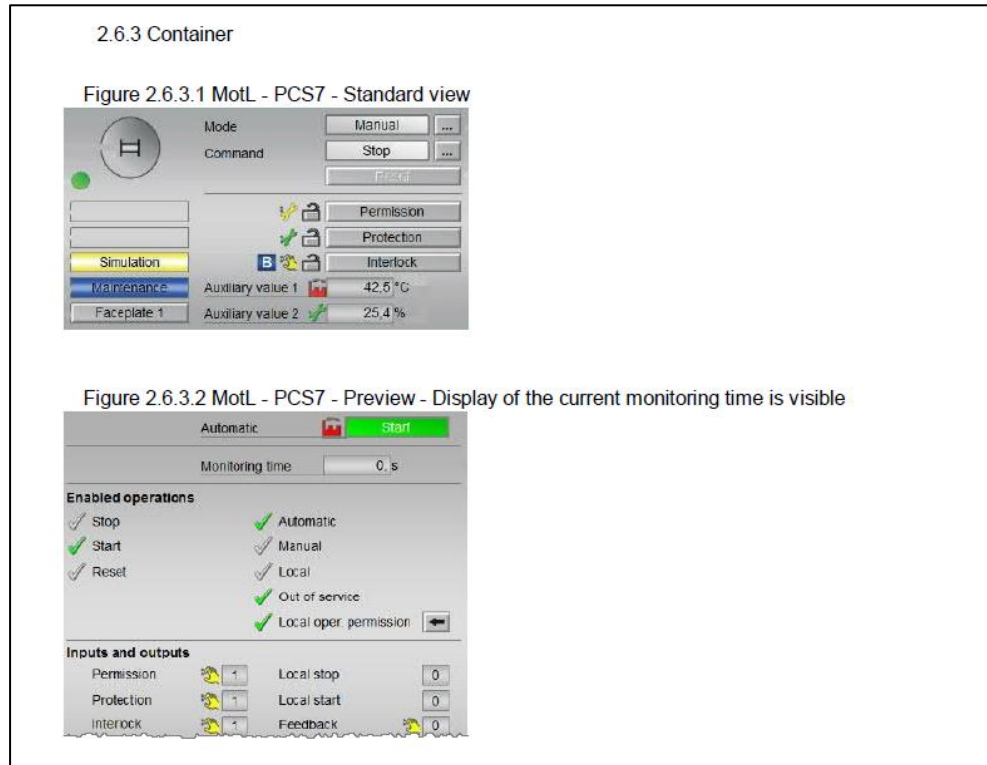
Figure 3-13



Faceplates

The subsection "Faceplates" shows the user interfaces for Operator Station and optional Comfort Panel with their technical and technological functions.

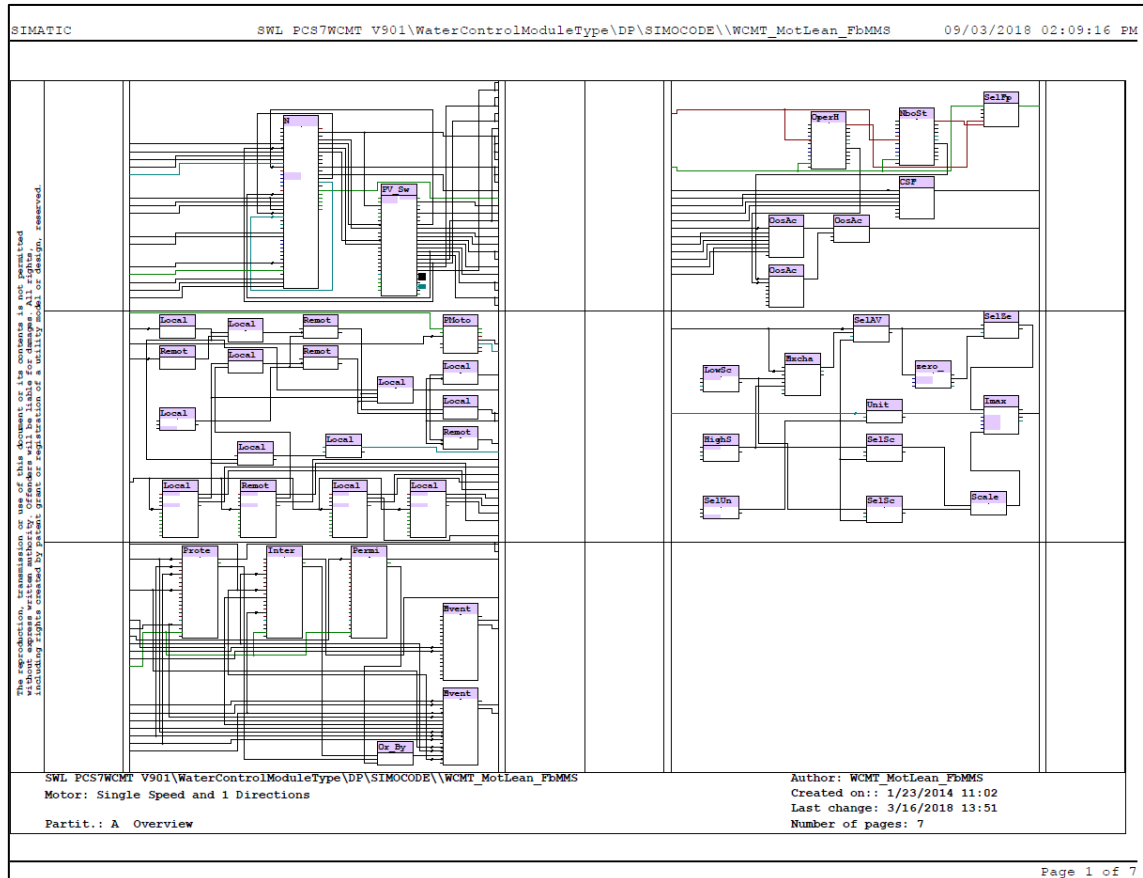
Figure 3-14



3.3 CFC charts

As an extension of the profile, the CFC plan with all modules and connections is shown.

Figure 3-15: "WCMT_PCS7MotLean_FbMMS "–Profile– CFC overview



Note

All associated individual plans are shown in the S7_WCMT profile following the CFC overview.

5 Installationinstructions

5.1 Installed software

The following table provides a comprehensive overview of the use of all software packages, including version statuses. Apart from the standard PCS 7 installation, the license-based ES software packages for Industry Library, TIA Portal, SITRANS Library, SIMOCODE ES and STARTER can be added as needed. It is also possible to use the PCS 7 Water Templates without these software packages. In such case, the templates do not contain additional functions, such as Panel blocks from the Industry Library.

Table 5-1

Name	Version	Release	Version
DBA LANG DE	V9.0	09.00.00.00_03.01.00.05	V9.0.0.0
DBA Address Config	V9.0	09.00.00.00_03.01.00.05	V9.0.0.0
WinCC Advanced Process Control	V7.4 + SP1 + Upd4	V07.04.20.04_01.01.00.41	K7.4.1.4
CFC	V9.0 + SP1 + Upd2	09.00.01.02_01.11.00.01	K9.0.1.2
DBA Faceplates	V9.0	09.00.00.00_03.01.00.05	V9.0.0.0
DBA Licenses	V9.0	09.00.00.00_03.01.00.05	V9.0.0.0
PCS 7 TeleControl DBA	V9.0	09.00.00.00_04.01.00.08	V9.0.0.0
SIMATIC DiagMonitor	V05.00.02	V05.00.02.00_01.01.00.02	V05.00.02.00
PCS 7 DNP DBA	V9.0	09.00.00.00_04.01.00.08	V9.0.0.0
DOCPRO	V9.0 + SP1	09.00.01.00_01.44.00.02	K9.0.1.0
Drive ES PCS7 APL-Lib AS	V9.0	V09.00.00.00_00.00.00.33	V09.00.00.00
Drive ES PCS7 APL-Lib OS	V9.0	V09.00.00.00_00.00.00.10	V09.00.00.00
PCS 7 EDC DBA	V9.0	09.00.00.00_04.01.00.08	V9.0.0.0
IEAPO	V9.0 + SP1	09.00.01.00_01.44.00.02	K9.0.1.0
PCS 7 IEC 60870 Marshalling Blocks	V9.0	09.00.00.00_04.01.00.08	V9.0.0.0
SIMATIC PCS7 IEC 60870 Marshalling Types	V9.0	09.00.00.00_01.01.00.01	V09.00.00.00
PCS 7 IEC 60870 DBA	V9.0	09.00.00.00_04.01.00.08	V9.0.0.0
SIMATIC IS-Ready	2014 SP3	V14.00.03.00_00.00.00.44	K14.0.3.0
Automation License Manager	V5.3 + SP4 + Upd2	05.03.04.02_01.01.00.06	K5.3.4.2
PCS 7 MODBUS DBA	V9.0	09.00.00.00_04.01.00.08	V9.0.0.0
PCS 7 PowerControl Faceplates	V9.0	09.00.00.00_04.01.00.05	V9.0.0.0
DBA	V9.0	09.00.00.00_03.01.00.05	V9.0.0.0
SIMATIC PCS 7 Library	V7.1 + SP3 + Upd4	K07.01.03.04_01.06.00.01	K7.1.3.4
SIMATIC PCS 7 PID-Tuner	V8.0 + SP1 + Upd2	K08.00.01.02_01.03.00.02	K8.0.1.2

Name	Version	Release	Version
SIMATIC PCS 7 Basis Faceplates	V9.0 + SP1 + Upd1	09.00.01.01_01.04.00.04	K9.0.1.1
SIMATIC PCS 7 Faceplates	V7.1 + SP3 + Upd1	K07.01.03.01_01.04.00.01	K07.01.03.01
SIMATIC PCS 7 Advanced Faceplates	V9.0 + SP1	09.00.01.00_04.01.00.01	K9.0.1.0
SIMATIC PCS 7 Advanced Process Library	V9.0 + SP1 + Upd1	09.00.01.01_01.01.00.01	K9.0.1.1
SIMATIC PCS 7 Basis Library	V9.0 + SP1 + Upd1	09.00.01.01_01.07.00.01	K9.0.1.1
PCS7MPC	V8.1	V08.01.00.00_01.16.00.01	V8.1.0.0
DBA Common Basis	V9.0	09.00.00.00_03.01.00.05	V9.0.0.0
PCS 7 System Documentation ES	V9.0 + SP1	V09.00.01.00_01.01.00.23	K9.0.1.0
SIMATIC PCS 7 HSP	V9.0 + SP1	V09.00.01.00_07.01.00.03	V09.00.01.00
__SIMATIC PCS 7 EU__	V9.0+SP1	V09.00.01.00_07.01.00.03	---
PCS 7 System Documentation Runtime	V9.0 + SP1	V09.00.01.00_01.01.00.23	K9.0.1.0
SIMATIC PCS 7 Tools	V9.0 + SP1	09.00.01.00_07.01.00.03	K9.0.1.0
PCS 7 PowerControl Library	V9.0	09.00.00.00_04.01.00.05	V9.0.0.0
PCS 7 PowerControl Profibus Driver	V9.0	09.00.00.00_04.01.00.05	V9.0.0.0
SIMATIC PDM Logon Option	V9.1 + Upd2	09.01.00.02_01.07.00.02	K9.1.0.2
SIMATIC PDM Server Option	V9.1 + Upd2	09.01.00.02_01.07.00.02	K9.1.0.2
PCS 7 PowerControl	V9.0	09.00.00.00_04.01.00.05	V9.0.0.0
PCS 7 PowerControl Licenses	V9.0	09.00.00.00_04.01.00.05	V9.0.0.0
PCS 7 PowerControl Docs	V9.0	09.00.00.00_04.01.00.05	V9.0.0.0
SIMATIC ProSave	V14.0 SP1	V14.00.01.00_12.01.00.01	V14.00.01.00
Primary Setup Tool	V4.2	V04.02.00.00_09.01.00.01	V4.2.0.0
PUDManager - Help Viewer	V1.1 + Upd1	V01.01.00.01_01.00.00.18	K1.1.0.1
PV InsInfo-Server	V9.0 + SP1	09.00.01.00_01.44.00.02	K9.0.1.0
DBA Runtime Extension Framework	V9.0	09.00.00.00_03.01.00.05	V9.0.0.0
DBA Script Engine	V9.0	09.00.00.00_03.01.00.05	V9.0.0.0
DBA Runtime Extension Framework Support	V9.0	09.00.00.00_03.01.00.04	V9.0.0.0
SIMATIC Remote Publisher	V7.4 + SP1	V07.04.20.00_01.32.00.02	K7.4.1.0
AS-OS-Engineering	V9.0 + SP1 + Upd1	09.00.01.01_01.02.00.04	K9.0.1.1
SIMATIC S7-SCL	V5.6	V5.6.0.0_11.1.0.1	V5.6.0.0
SIMATIC SFC	V9.0 + SP1	09.00.01.00_01.44.00.02	K9.0.1.0

Name	Version	Release	Version
SIMATIC SFC Visualization(SFV)	V9.0 + SP1	09.00.01.00_01.44.00.02	K9.0.1.0
SIMATIC IL PCS 7 Faceplates for PCS7 OS	V9.0 + Upd1	09.00.00.01_02.07.00.02	K9.0.0.1
SIMATIC IL PCS 7 Function Blocks as addition for APL	V9.0 + Upd1	09.00.00.01_02.07.00.02	K9.0.0.1
SIMATIC IL Step7 Faceplates for WinCC SCADA	V9.0 + Upd1	09.00.00.01_02.07.00.02	K9.0.0.1
SIMATIC IL Step7 Function Blocks for S7 300	V9.0 + Upd1	09.00.00.01_02.07.00.02	K9.0.0.1
SIMATIC NET PC Software	V14.0 SP1 + Upd2	V14.00.01.02_51.27.00.01	14.0.1.2
SIMATIC TIA Portal IL Function Blocks as addition for APL	V9.0 + Upd1	09.00.00.01_02.07.00.02	K9.0.0.1
SIMATIC Logon	V1.6	01.06.00.00_01.08.00.01	V1.6.0.0
SIMOCODE pro PCS 7 Faceplates (optional)	V9.0	09.00.00.00_01.00.00.16	V09.00.00.00
SIMOCODE pro PCS 7 Librar (optional)y	V9.0	09.00.00.00_01.00.00.16	V09.00.00.00
SINAUT ST7 - TD7 Library Basic01 (optional)	V2.2 + SP4 + HF1	V02.02.04.01_01.01.00.01	V02.02.04.01
SINAUT - Engineering-Software (optional)	V5.5 + SP2	V05.05.02.00_01.01.00.04	V05.05.02.00
PCS 7 SINAUT DBA	V9.0	09.00.00.00_04.01.00.08	V9.0.0.0
PCS 7 SINAUT Marshalling Blocks (optional)	V9.0	09.00.00.00_04.01.00.08	V9.0.0.0
SIMATIC PCS7 SINAUT Marshalling Types (optional)	V9.0	09.00.00.00_01.01.00.01	V09.00.00.00
SIMATIC PDM	V9.1 + Upd2	09.01.00.02_01.07.00.02	K9.1.0.2
SIMOCODE ES	2007 + SP9	V2.0.9.0_1.1.0.31	V2.0.9.0
SIRIUS engineering Components Global	1.0	---	V1.0.0.0
SITOP PCS 7 Application Example (AS)	V3.1	V03.01.00.00_01.00.00.13	V3.1.0.0
SITOP PCS 7 Application Example (OS)	V3.1	V03.01.00.00_01.00.00.13	V3.1.0.0
SL V8.0: PCS 7 Faceplates for PCS7 OS	V8.0	08.00.00.00_01.01.00.30	V8.0.0.0
SL V8.0: PCS 7 Function Blocks	V8.0	08.00.00.00_01.01.00.30	V8.0.0.0
SL V8.0: PCS 7 Drivers	V8.0	08.00.00.00_01.01.00.30	V8.0.0.0
SL V8.0: S7 Faceplates for WinCC	V8.0	08.00.00.00_01.01.00.31	V8.0.0.0

Name	Version	Release	Version
SL V8.0: S7 Function Blocks	V8.0	08.00.00.00_01.01.00.31	V8.0.0.0
SIMATIC Management Agent	V9.0 + Upd1	09.00.00.01_00.00.00.70	K9.0.0.1
SIMATIC NET PC Software Doc	V14.0 + SP1	V14.00.01.00_51.25.00.01	V14.0.1.0
STARTER	V5.1.1.0	V05.01.01.00_05.10.41.00	V5.1.1.0
STEP 7	V5.6 + HF3	K5.6.0.3_7.1.0.1	K5.6.0.3
DBA Channel	V9.0	09.00.00.00_03.01.00.04	V9.0.0.0
PCS 7 TeleControl Faceplates	V9.0	09.00.00.00_04.01.00.08	V9.0.0.0
DBA Base	V9.0	09.00.00.00_03.01.00.04	V9.0.0.0
PCS 7 TeleControl	V9.0	09.00.00.00_04.01.00.08	V9.0.0.0
PCS 7 TeleControl Licenses	V9.0	09.00.00.00_04.01.00.08	V9.0.0.0
PCS 7 TeleControl DBA Licenses	V9.0	09.00.00.00_04.01.00.08	V9.0.0.0
PCS 7 TeleControl Docs	V9.0	09.00.00.00_04.01.00.08	V9.0.0.0
DBA Base Faceplates	V9.0	09.00.00.00_03.01.00.04	V9.0.0.0
TH	V9.0 + SP1	09.00.01.00_01.44.00.02	K9.0.1.0
Version Cross Manager (VXM)	V9.0 + SP1	09.00.01.00_01.44.00.02	K9.0.1.0
WinCC Runtime	V7.4 + SP1 + Upd4	V07.04.20.04_01.01.00.41	K7.4.1.4
WinCC Configuration	V7.4 + SP1 + Upd4	V07.04.20.04_01.01.00.41	K7.4.1.4
WinCC OPC Server	V3.9 + SP7 + Upd3	03.09.07.03_01.01.00.01	K3.9.7.3
WinCC OPC-UA Client	V1.0 + SP1 + Upd4	01.00.01.04_01.01.00.01	K1.0.1.4
SIMATIC WinCC Smart Tools	V7.4 + SP1	V07.04.20.00_01.32.00.02	K7.4.1.0
XML TRANSFER	V9.0 + SP1 + Upd1	09.00.01.01_01.11.00.01	K9.0.1.1
SIMATIC PCS 7 Tools 64	V9.0 + SP1	09.00.01.00_07.01.00.03	K9.0.1.0

5.2 Dearchiving in SIMATIC Manager

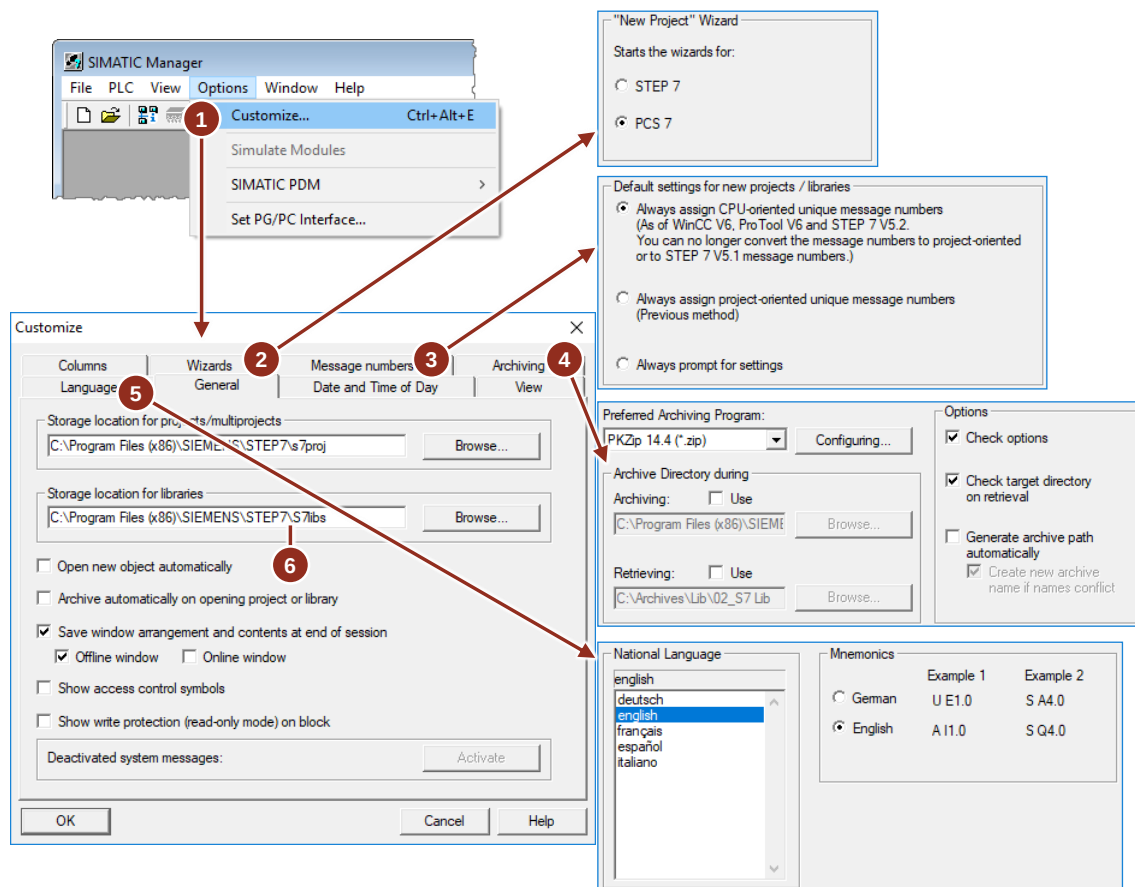
The libraries of the PCS 7 Water Templates, from this application example, can be obtained from your regional contact.

https://www.automation.siemens.com/aspa_app/?lang=de

Dearchive the libraries with the standard function "Dearchive" in SIMATIC Mannager.

Make sure you read the project settings below.

Figure 5-1



- (1) Open the project settings of the SIMATIC manager.
- (2) Wizard: Activate the wizard for PCS 7
- (3) Message numbers: Select the "Always assign CPU-oriented unique message numbers" as the default setting for new projects or libraries.
- (4) Archive PCS 7 projects: Choose an archiving program and the storage location for the archived projects.
- (5) Language: Select the language for the user interface of SIMATIC Manager and the project representation.
- (6) Storage location of the PCS 7 Water Templates with the name "Swl_AdvV901pcs7" is stored under the default setting C:\SIEMENS\Step7\S7lib.

Note

The global settings listed above apply for each PCS 7 project that opens with SIMATIC Manager. To accept these settings, the SIMATIC Manager must be closed and restarted.

6 Appendix

6.1 Glossary

Table 6-1

Term	Explanation
AdvES	Advanced Engineering System
APL	Advanced Process Library (individual control module type library) The PCS 7 AP Library V9.0 SP1 basically contains all blocks and functionalities of the PCS 7 Library V9.0 SP1 and offers additional functionalities as well as completely new blocks. All parameters of the APL blocks are subject to a new naming convention.
TIA	With Totally Integrated Automation™, Siemens offers a universal range of products and systems for the efficient automation of plants in the water industry – whether in water, wastewater, irrigation or desalination.
TIP	Totally Integrated Power™ stands for integrated electrical energy distribution plants for infrastructure, buildings and industry.
Base line library	Since the PCS 7 Library V9.0 and the PCS 7 AP Library V9.0 can be installed either individually or together, the blocks needed together have been moved to the PCS 7 Basic Library V9.0. This consists largely of driver blocks.
Standard Library	The PCS 7 Library V9.0 corresponds to the PCS 7 Library V8.2.
CFC	Continuous Function Chart A higher graphic language with function blocks for configuring continuous control systems.
Chart	The document in which the automation functions can be created with the CFC Editor or the SFC Editor.
CSV	Comma Separated Value ASCII text format for storing table data.
Faceplate	Standard operating screen A graphic element on the screen of the operator station which represents, for instance, an analogue control instrument, a hardwired pushbutton or a switch and enables the operator to monitor and operate the device.
Function block	A control module as defined in IEC 1131-3. See also "Block".
Instance	A copy of a function block, which is reused for the control configuration of a similar application.
Communication connection	The hardware and software for the transmission and reception of analogue and digital information via a communication system such as, for instance, a bus.
Module (assembly, block)	A group of interconnected components that constitute a recognizable device, instrument or equipment item. An assembly can be switched off, removed as a complete unit and replaced with a spare part. It has definable performance characteristics which permit its examination as a unit.
Mode/operating mode	Operating condition of control modules such as Manual, Automatic or Cascade.

Term	Explanation
Operator Station (OS)	Electronic equipment that carries the man-machine interface, which includes at least a monitor, a keyboard and a pointing device and is used by at least one operator to monitor and operate the assigned process or the manufacturing units assigned to him.
PROFIBUS (Process Field Bus)	Field bus according to EN 50170 Vol. 2 PROFIBUS (DIN 19245; bus system for industrial application based on PROFIBUS).
Plug and play	The ability of hardware devices to identify themselves automatically to the system. If the device is switched on, it is automatically assigned a unique identifier, without the need for DIP switches to be set.
Process object (PO)	A collection of tags and parameters that runs a controller/function module (e.g. engine, check valve, PID controller), which may consist of more than one I/O point.
Protocols	Output of information in normalized representation; e.g. as a print-out, a screen display or a file.
Redundant	A system/subsystem with two modules that perform an automatic switchover (alternate circuit) without loss of system function when an error occurs.
Control (regulatory control)	The functions of process measurement, execution of control algorithms and control of a device actuator which enable the automatic control of a plant process.
Security	System access control by means of a key lock, password, electronic card or equivalent method.
SFC	Sequential Function Chart A higher graphical configuration language for sequential control applications.
PLC	Programmable Logic Controller Used for discrete and continuous control in processing and manufacturing facilities.
System bus	The network, used for communication between controllers and HMI Servers.
Tag	A collection of attributes that specifies a control loop, a process tag, a measured input, a calculated value or a combination thereof, as well as all its control/closed-loop control and output algorithms. Each tag is unique.
Tag ID	The unique alphanumeric code assigned to inputs, outputs, device positions and control modules. The tag ID can contain the plant area identifier
Terminal bus	The network for communication between HMI clients and HMI servers.
Availability	The probability that a system can perform an intended function when required.
Reliability	The probability that the system or component complies with its intended use for a defined period, usually measured as "Mean Time Between Failures" (MTBF).

6.2 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 queries with numerous tailor-made offers – ranging from basic support to individual support contracts. Please send queries to Technical Support via Web form:

www.siemens.com/industry/supportrequest

SITRAIN – Training for Industry

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

For more information on our offered trainings and courses, as well as their locations and dates, refer to our web page:

www.siemens.com/sitrain

Service offer

Our range of services includes the following:

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

You can find detailed information on our range of services in the service catalog web page:

<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>

6.3 Links and Literature

Table 6-2

No.	Topic
\1\	Siemens Industry Online Support https://support.industry.siemens.com
\2\	Link to the article page of the application example https://support.industry.siemens.com/cs/ww/en/view/78604785
\3\	SIMATIC PCS 7 V9.0 – Room for new perspectives https://www.siemens.com/global/de/home/produkte/automatisierung/prozessleitsystem/simatic-pcs-7/v9.html
\4\	SIMATIC PCS 7 technical documentation Manuals for process control system and migration
\5\	SIMATIC PCS 7 Online Support (Overview) https://support.industry.siemens.com/cs/ww/en/view/63481413
\6\	SIMATIC PCS 7 V9.0 SP1 – Licenses and quantity structures https://support.industry.siemens.com/cs/ww/en/view/109754986
\7\	Offer tool ProTime - Calculation of a PCS 7 system https://w3.siemens.com/mcms/process-control-systems/de/simatic-pcs-7/angebotstools/Pages/angebotstools.aspx#ProTime
\8\	SIMATIC Process control system PCS 7 Advanced Process Library Readme V9.0 SP1 Update 2 (Online) https://support.industry.siemens.com/cs/ww/en/view/109757947
\9\	SIMATIC PCS 7 Library V7.1 SP3 Upd4 https://support.industry.siemens.com/cs/ww/en/view/109756832
\10\	Sales and Delivery Release: SIMATIC PCS 7 Industry Library V9.0 https://support.industry.siemens.com/cs/ww/en/view/109750720
\11\	Manual SIMATIC PCS 7 Industry Library V9.0 https://support.industry.siemens.com/cs/de/en/view/109738716
\12\	SIMATIC PCS 7 Condition Monitoring Library V9.0 https://support.industry.siemens.com/cs/de/en/view/109751047
\13\	Sales and Delivery Release: SIMATIC PCS 7 TeleControl V9.0 https://support.industry.siemens.com/cs/ww/en/view/109750089
\14\	Integrated engineering based on COMOS with SIMATIC PCS 7 and SIMIT simulation https://support.industry.siemens.com/cs/ww/en/view/56731718
\15\	SITRANS Library https://w3.siemens.com/mcms/sensor-systems/de/messumformer/kommunikation-und-software/Seiten/SITRANS-Library.aspx
\16\	Project planning of frequency inverters with the APL channel module "FbDrive" in SIMATIC PCS 7 https://support.industry.siemens.com/cs/ww/en/view/64181993
\17\	Project planning of direct starters with the APL channel block "FbSwtMMS" in SIMATIC PCS 7 https://support.industry.siemens.com/cs/ww/en/view/64182525
\18\	Manual Collection - SIMOCODE pro https://support.industry.siemens.com/cs/ww/en/view/109743951
\19\	MAG 5000/6000 Operating Instructions https://support.industry.siemens.com/cs/ww/en/view/85671888

No.	Topic
\20\	Configuration of SINAMICS and MICROMASTER drives with Drive ES in PCS 7 https://support.industry.siemens.com/cs/ww/en/view/58007228
\21\	Remote Configurations in Water and Wastewater Technology https://support.industry.siemens.com/cs/ww/en/view/61024137
\22\	Typical configurations in water and wastewater technology https://support.industry.siemens.com/cs/ww/en/view/61024766
\23\	All-round protection with Industrial Security - Plant Security https://support.industry.siemens.com/cs/ww/en/view/50203404
\24\	Application Description for 3-way Control via SIMOCODE https://support.industry.siemens.com/cs/ww/en/view/61026729
\25\	Working Templates for Specifying Technical Functions with SFC Types in SIMATIC PCS 7 https://support.industry.siemens.com/cs/ww/en/view/33412955
\26\	Integration of Comfort Panels, Operator Panels and S7-300 Package Units in SIMATIC PCS 7 with PCS 7 Industry Library https://support.industry.siemens.com/cs/ww/en/view/50708061
\27\	Software for integration of the SITRANS product family in SIMATIC https://support.industry.siemens.com/cs/ww/en/view/65741624
\28\	System libraries http://w3.siemens.com/mcms/process-control-systems/en/simatic-pcs-7/simatic-pcs-7-systemkomponenten/Systembibliotheken/Pages/Systembibliotheken.aspx
\29\	PROFIBUS PA/PD Profile III Operating Instructions https://support.industry.siemens.com/cs/ww/en/view/22437482
\30\	Automating with STEP 7 in AWL and SCL Author: Hans Berger Publicis MCD Publisher ISBN: 978-3-89578-397-5
\31\	Process Control System Engineering Author: Leon Urbas Oldenburg Industrial publishing house ISBN: 978-3-8356-3198-4

6.4 Change documentation

Table 6-3

Version	Date	Change
V1.0	11/2017	First edition
V2.0	10/2018	Upgrade to SIMATIC PCS 7 V9.0 SP1