



SIEMENS



**Standard PCS 7 Water
Templates for the
Water Industry**

SIMATIC PCS 7 V9.1 SP2 UC01 / PCS 7 APL V9.1 SP1 /
PCS 7 Industry Library V9.1 / SITRANS Library V13.0
UC01 / 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, including pump stations, detention pipes and wastewater management
- Desalination
- Water transport (pipelines, water distribution)
- Irrigation

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

- Industrial water
- Water purification
- Dams
- Weirs
- Waterways/locks
- Dyke systems/flood protection
- Other branches

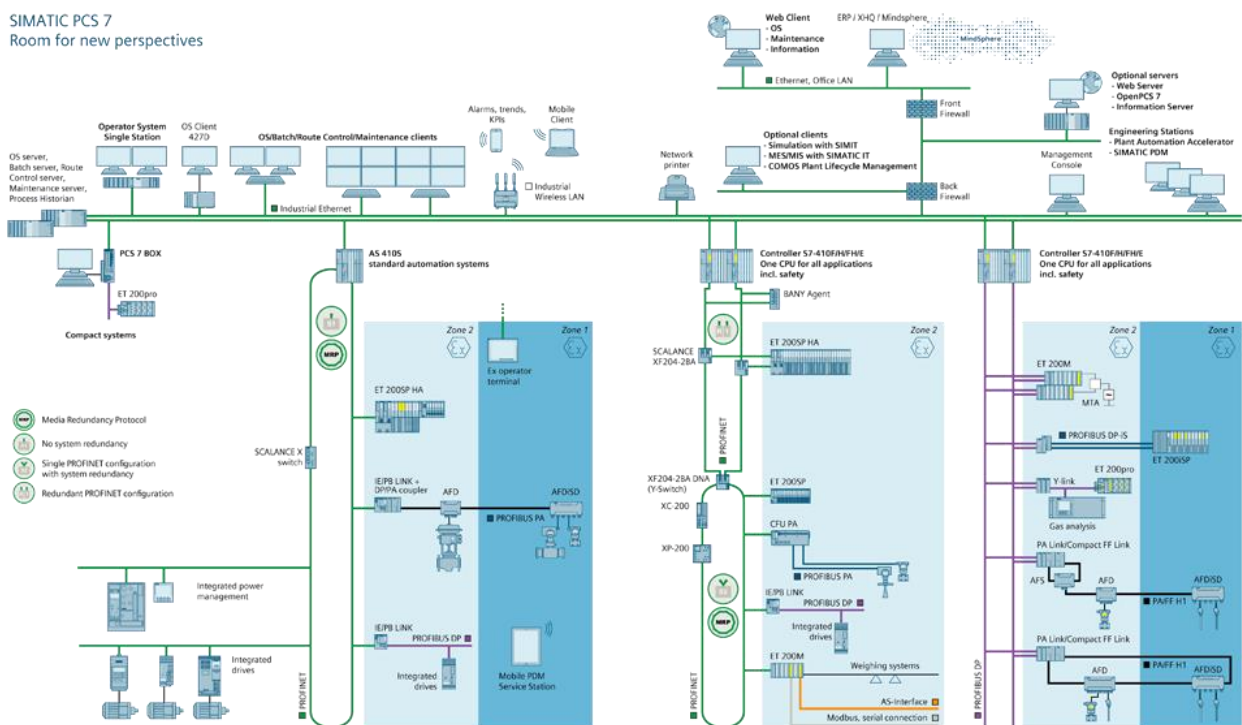
1.2 Requirements

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 cost of all investments incurred over the entire life cycle (Total Cost of Ownership = TCO).

The technical requirements are focused on scalable solutions using SIMATIC S7-400 hardware, tailored from the smallest system 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 motors, gate valves, valves, and frequency converters.

Figure 1-1



In particular, the connection of decentralized structures such as pump stations, sewer networks, water reservoirs, and detention pipes, via remote data link and/or telecontrol is another important aspect within the framework of technical requirements in the water industry.

1.3 System requirements

The PCS 7 Water Templates are based on the following components, some of which are subject to licensing:

- SIMATIC PCS 7 Advanced Process Library (APL).....(MANDATORY)
- SIMATIC PCS 7 Add-On Industry Library (IL)(MANDATORY)
- SIMATIC PCS 7 Add-On Power Control APL Library (PC)(OPTIONAL)
- SITRANS Library (SL) – free(OPTIONAL)
- SITOP Library – free(OPTIONAL)
- SIMATIC Modbus/TCP(OPTIONAL)
- SENTRON PCS 7 3WL/3VA/PAC(OPTIONAL)
- SENTRON PCS 7 PAC(OPTIONAL)
- SIRIUS PCS 7 Softstarter 3RW55(OPTIONAL)
- SIRIUS PCS 7 SIMOCODE pro V(OPTIONAL)

Use in your configuration environment or in Process Mode requires that you purchase the engineering and runtime licenses for the Industry Library, and in some cases also those for the PCS 7 device libraries listed above should the blocks and functions be used.

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

Parameter assignment and commissioning of SENTRON and SIRIUS devices or Modbus/TCP necessitate licensed WinCC Comfort/Advanced (TIA Portal) V17 Upd4 software or Process Device Management (PDM) V9.2 SP2.

In the following Table you can find the links to the ordering information or the free downloads of the products used:

Table 1-1

Product	Link
PCS 7 Industry Library (IL)	https://support.industry.siemens.com/cs/ww/en/view/109805501
PCS 7 Power Control (PC)	https://support.industry.siemens.com/cs/ww/en/view/109795864
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 V17 (TIA Portal)	https://support.industry.siemens.com/cs/ww/en/view/109793078
SENTRON Library	https://support.industry.siemens.com/cs/ww/en/view/109793809
Modbus/TCP	https://mall.industry.siemens.com/mall/en/WW/Catalog/Products/10165502

1.4 Conceptual structure

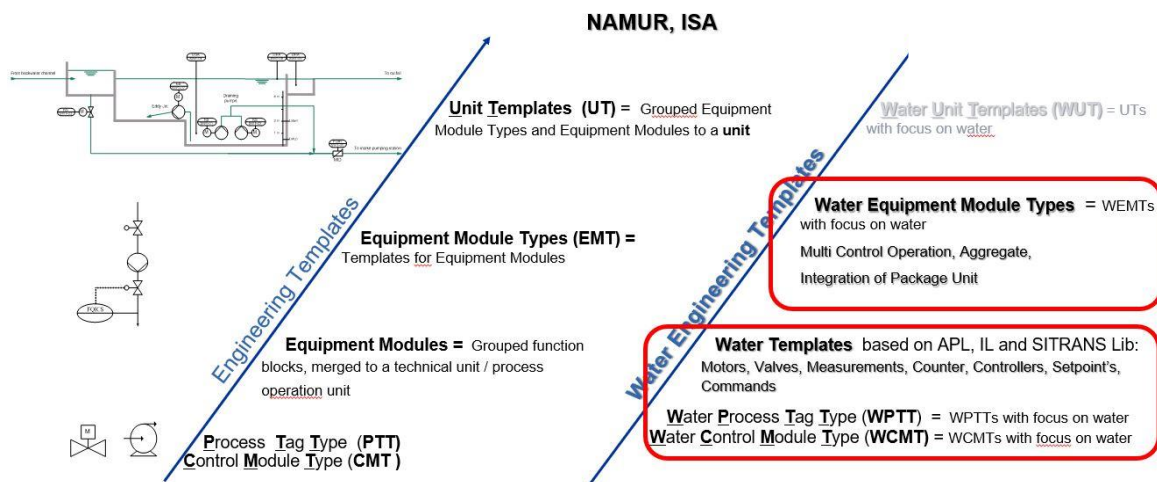
1.4.1 Standardized Engineering Templates in Process Control

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

- Cost reduction for application development and basic engineering
- Standardization through unified program structures
- Safe operator control and monitoring with uniform look & 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



Equipment Modules

An Equipment Module describes a functional group of equipment items / plant components that can perform a limited number of smaller process activities. Equipment Modules are typified as:

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

and contain:

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

Equipment Module Type

Equipment Module Types are templates for Equipment Modules.

Unit Template

Unit Templates consist of Equipment Module Types with hierarchical structures interconnected to form a Unit (e.g. a detention pipe).

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 Templates consist of three groups:

Water Equipment Module

Table 1-2

Abbreviation	Explanation of term
WPTT	W ater P rocess T ag T ype Water-specific process tag type
WCMT	W ater C ontrol M odule T ype Water-specific control module type

Water Equipment Module Type

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> emplate A water-specific Unit

NOTE

This document describes primarily the design and use of PCS 7 Water Control Module Types. The descriptions below mainly use the term "PCS 7 Water Template(s)".

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. These requirements and guidelines adhered to in the construction, operation, maintenance and care of such plants. The most important water-specific requirement is to ensure plant operation in case of a partial or complete failure of the remote process control and/or automation engineering functions.

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 switchovers for 8/16 drives
- 96 turning points with 15 minutes setpoint curve definitions
- Configurable 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 Units solutions with S7-300 / IM151-8 / S7-1500 / S7-410S / S7-410H in process control technology
- Simple integration of Package Unit solutions via OPC UA
- SIMATIC CPU 410 cloud link via MQTT
- Global Function Service (GFS) with clock, blink button, initialization, etc.
- Message overload suppression for medium-voltage distribution boards, low-voltage distribution boards or remote data transmission
- Prefabricated indicator light control with simplified engineering

- Example drive solutions for AUMA © actuators via PROFIBUS/PROFINET connection
- Complete drive solutions (pumps, agitators, etc.) via PROFIBUS DP/PROFINET with SIMOCODE pro V (incl. hardware engineering)
- Complete drive solutions (dosing pumps, blowers, etc.) with SINAMICS G120X with or without fieldbus connection (incl. hardware engineering)
- Integrated solution with SITRANS F, SITRANS L, SITRANS P and SITRANS T process instrument solutions with or without fieldbus connection (PROFIBUS DP/PA)
- Integrated solution for SITOP 24V DC monitoring with or without fieldbus connection (PROFINET)
- Integrated energy technology solutions for low-voltage and medium-voltage distribution systems compliant with IEC 61850 with or without fieldbus connection (PROFIBUS/PROFINET)

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 primarily on the PCS 7 APL, the PCS 7 IL and the PCS 7 Power Control Library. A WPTT can also contain function blocks from the SITRANS Library and/or the SITOP Library.

The process tag types can be edited in PCS 7 or alternatively in COMOS.

NOTE

WPTTs are discontinued with SIMATIC PCS 7 V8.2 onward. They have been completely replaced by the WCMTs.

1.4.5 Water-specific control module types

The water control module types (WCMTs) are linkages from the master data library with special advantages with regard to variant creation and the connection of sub control modules. They also possess functions for synchronizing with the types and for bulk data engineering with COMOS or with 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 I/Os" has been introduced in the CFC Editor from PCS 7 V8.0 SP2 Upd 9 onwards.

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

- a CFC chart
- a PCS 7 OS block icon
- a PCS 7 APL faceplate

The WCMTs are preset to the essential water-specific functions and can be adapted to the operational requirements by the user within the master data library at any time and on a project-specific basis. The Water Templates do not lose their standardization character.

1.4.6 Water-specific Equipment Module Types

Water-specific Equipment Module Types (WEMT) are technical units which can be composed of controls, valves, sensors, machinery/drives, sequencers and/or mechanical components. The individual WEMTs are grouped from various PCS 7 Water Templates (WCMT) or consist of separate process control operational units. The WEMTs for control system operations (e.g. multi-user selection, machinery switchover, Package Unit connection) are stored as CFCs. Controls, such as split-range control, are created in the form of a sample solution.

WEMTs are stored in a PCS 7 master data library. They comprise:

- a CFC chart
- a PCS 7 OS block icon
- a PCS 7 APL faceplate
- an SFC type / chart.

Processing via bulk 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 efficient bulk data engineering combined with the PCS 7 Water Templates in COMOS/PCS 7 Plant Automation Accelerator ("Integrated Engineering").

1.4.7 Water-specific Unit Templates (WUT)

Water-specific Unit Templates are available for technical Units for the purpose of standardization. They are made up of the APL standard libraries, the Industry Library, SITRANS Library, SITOP Library and Power Control Library, the WCMTs and the WEMTs.

You can find the following ready-made Unit Templates for the water industry in the Online Support:

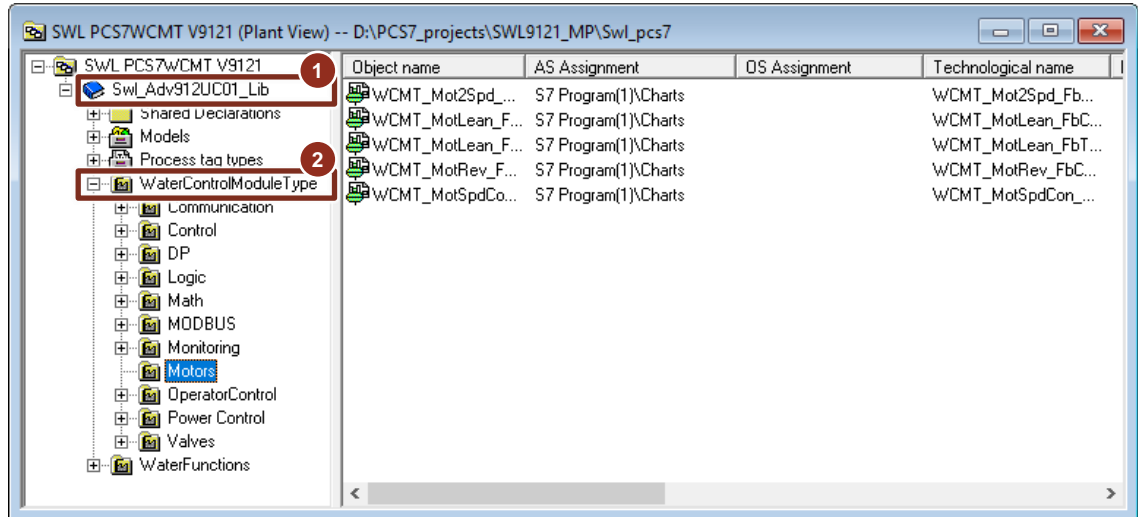
Table 1-5

No.	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: 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 collected in the PCS 7 library " Swl_Adv912UC01_Lib ". In the plant view, the water-specific CMTs are structured hierarchically as follows:

Figure 1-3



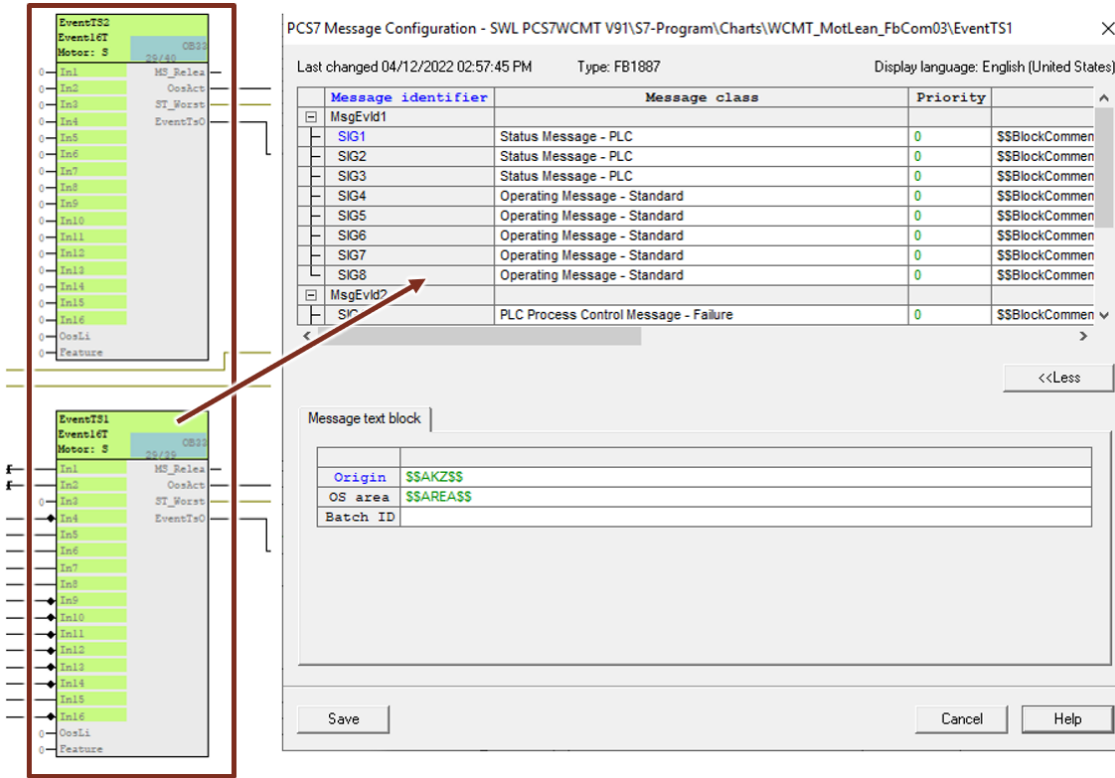
- (1) Library
- (2) Water-specific control module types (WCMT)

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



Motor controls

The following messaging applies to the templates "MotLean", "MotRev", "Mot2Spd", "MotSpdC":

Table 1-6

Bit	EventTS1	Message class	Priority	Info text	Acknowledgement
1	Motor on (right)	Status message - AS ¹	0		○
2	Motor off	Status message - AS ¹	0		○
3	Motor off (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/Disabled	General operation message	0		○
8	Operating mode preselection: local	General operation message	0		○
9	Motor 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	Process message with acknowledgment	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" is deactivated by default in order to save CPU storage space and process objects.

Gate valve/flap/valve controls

The following messaging applies to the templates "VlvL", "VlvMotL", "VlvAnL", "VlvPosL", "Vlv2Way":

Table 1-7

Bit	EventTS1	Message class	Priority	Info text	Acknowledgment
1	Gate valve/flap/valve open	Status message - AS ¹	0		○
2	Gate valve/flap/valve Stop	Status message - AS ¹	0		○
3	Gate valve/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/Disabled	General operation message	0		○
8	Operating mode preselection: local	General operation message	0		○
9	Motor 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	Process message with acknowledgment	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; the message class "general control message" must be set for all on-site operator actions. These message classes only support the signal change 0->1 (incoming). Signal change 1->0 (outgoing) is not recognized or supported. To ensure that the messages "motor off" or "gate valve stop" are archived correctly, these signals must also be interconnected at EventTS. With these message variants, all system states can be swiftly and unambiguously filtered and visualized from the archive (if long-term archiving is activated).

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 Water Templates, the user should have previous practical experience in the PCS 7 engineering environment and possess process technology-related knowledge of the water industry.

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

Additional information can be found in the following Readme files:

Table 1-8

No.	Link
/1/	SIMATIC PCS 7 V9.1 SP2 UC01 https://support.industry.siemens.com/cs/ww/en/view/109806027
/2/	PCS 7 Advanced Process Library (APL) V9.1 SP2 https://support.industry.siemens.com/cs/ww/en/view/109812806
/3/	PCS 7 Industry Library (IL) V9.1 https://support.industry.siemens.com/cs/ww/en/view/109805069
/4/	SITRANS Library (SL) V13 https://support.industry.siemens.com/cs/ww/en/view/109811653
/5/	SITOP Library V3.7 SP1 for PCS 7 https://support.industry.siemens.com/cs/ww/en/view/109476154

The separate engineering tool TIA Portal V17 (incl. SIMOCODE ES) is used to integrate IPC/Comfort Panel and SIMOCODE pro V. Engineering of SINAMICS G120X is only possible with a SMART ACCESS module interface or with an attendant IOP-2. After the IBS, the SINAMICS G120X can be worked on for maintenance and servicing purposes via PDM V9.2 SP2 with an associated FDI file from PCS 7. For further details, refer to the SINAMICS G120X manual.

NOTE

A complete overview of the installed software can be found in chapter: [4.1 Installed software](#)

S7 Water Templates are also available for use in PCS 7 with, at minimum, 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 in PCS 7 (with or without telecontrol technology), refer to the following article:

<https://support.industry.siemens.com/cs/ww/en/view/73133562>

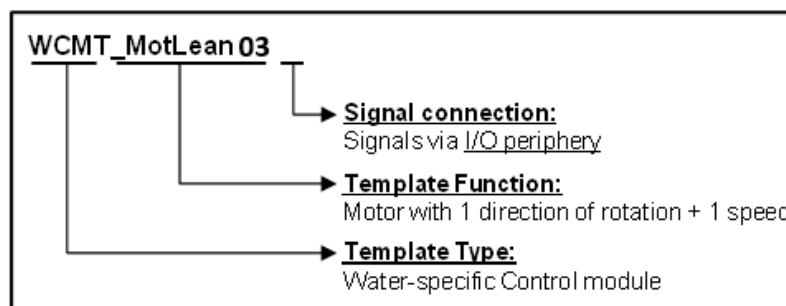
1.5.1 Definition of names and terms

The PCS 7 Water Templates for WCMTs, WEMTs and WUTs 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, WEMT, WUT)
2. All WCMT typicals in PCS 7 V9.1 SP2 end with the suffix "03".
3. Template function (name = technology block name from APL, IL, SITRANS library, SITOP library, SENTRON or Power Control library)
4. Signal connection (no text / _FbCom03 / _FbMMS03 / _FbMMS03 / _FbDrv03 / _FbDrv03)

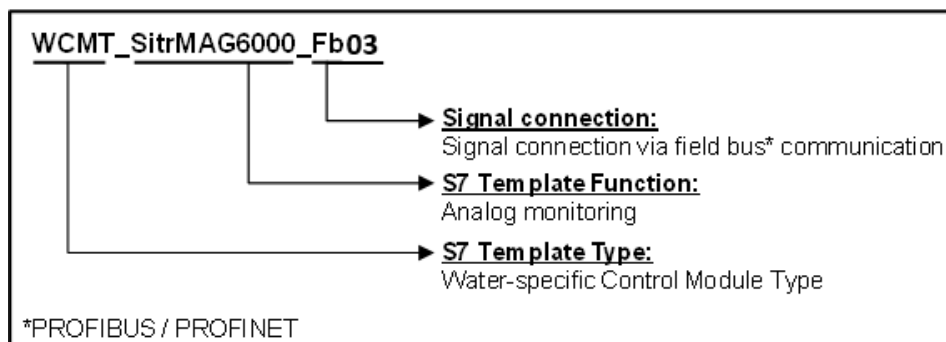
Templates that contain no text for the signal connection represent all CFCs with analog/digital input/output drivers.

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



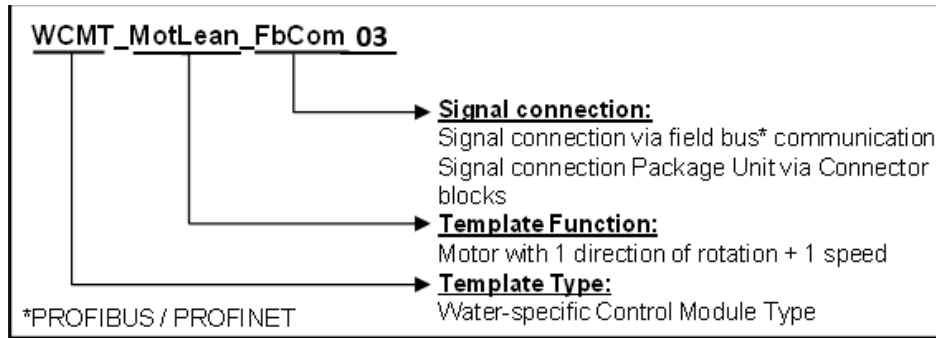
Templates whose signal connection contains "Fb03" represent CFCs with fieldbus drivers for PROFIBUS DP / PA or PROFINET.

Figure 1-6: "WCMT-SitrMAG600_Fb03" with fieldbus coupling



Templates whose signal connection contains "FbCom03" represent CFCs with fieldbus drivers for PROFIBUS DP / PA or PROFINET. Moreover, these Water Templates contain a simple and reorganized on-site control station, which is a functional equivalent of the first generation (<=PCS 7 V9.1). Additionally, this WCMT contains an integrated and standardized Package Unit connection with Connector blocks possessing structures.

Figure 1-7

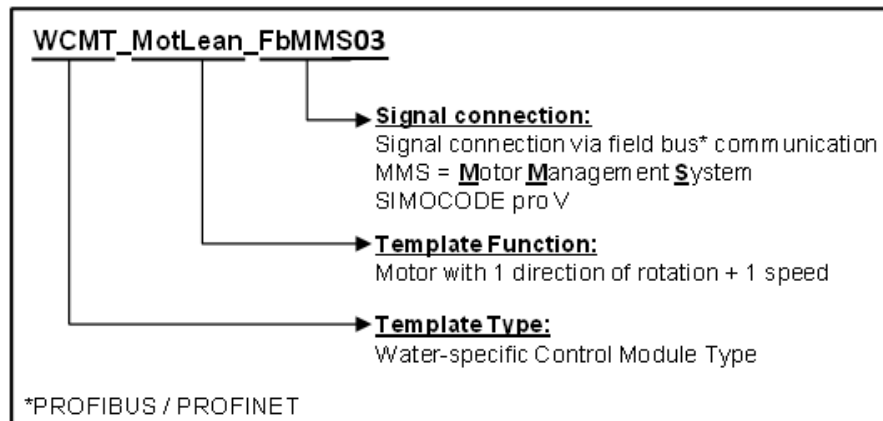


Templates that contain the signal connection "FbMMS" represent CFCs for SIMOCODE pro V with fieldbus drivers for PROFIBUS DP. WCMTs with the identifier "_FbMMS" are first-generation typicals for SIMOCODE pro V with PB and PN.

The "_FbMMS03" identifier indicates third-gen templates for SIMOCODE pro V in which changes were made to the on-site control stations (or where this was done as early as the second generation) but where the templates are functionally equivalent to the first and second generations (<= PCS 7 V9.1).

A combination of both SIMOCODE generations in one CPU is thus made possible.

Figure 1-8: WCMT SIMOCODE 1 direction of rotation; 1 speed and fieldbus coupling



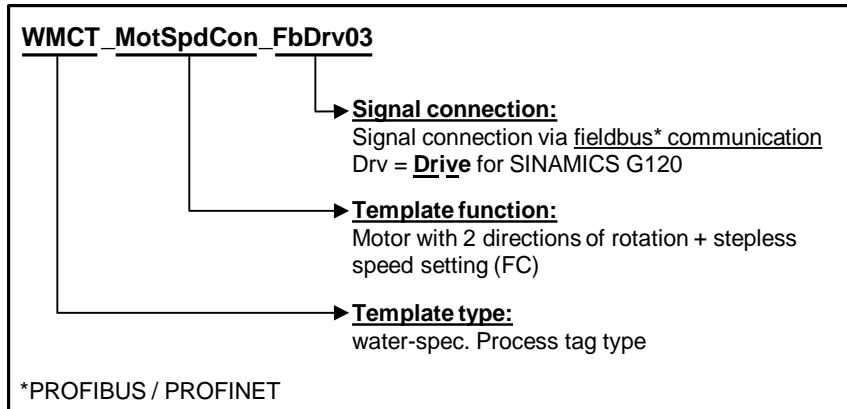
Templates whose signal connection contains "FbDrv" indicate CFCs for SINAMICS G120 with fieldbus drivers for PROFIBUS DP.

WCMTs with the "_FbDrv" identifier are first-generation typicals for SINAMICS G120X connections with PB and PN.

The "_FbDrv03" identifier indicates third-generation templates for the new SINAMICS G120X in which changes were made to on-site control stations that were already contained in the second generation.

A combination of both SINAMICS generations in one CPU is thus made possible.

Figure 1-9: WCMT SINAMICS frequency converter with two directions of rotation and fieldbus coupling



1.5.2 Overview of PCS 7 WCMTs

You have access to a total of 54 PCS 7 Water Templates of "Control Module Type". The following Table shows all templates in alphabetical order:

Table 1-9

Name	Function
WCMT_AccuS03	Derivation of a weighted accumulated value which can consist of either a count value or a constant measured value
WCMT_Aggr0803	Unit switchover for up to 8 drives
WCMT_Aggr1603	Unit switchover for up to 16 drives
WCMT_AUMAVx_FbCom03	Control of AUMA actuators
WCMT_CommRedSingle03	The block coordinates telegrams (SEND/REV) between a redundant and non-redundant AS via S7 communication
WCMT_Communication03	Connection of Package Units via PUT and GET communication blocks
WCMT_GFS03	Central CPU functions of a Unit/plant
WCMT_HachLange03	Monitoring of Hach-Lange sensors
WCMT_MODBUS_TCP_CP_RED03	Communication via Modbus
WCMT_MonAnalog03	Analog monitoring for flow, level, temperature, pressure, etc.
WCMT_MonAnalog_FbCFU03	Analog monitoring with fieldbus connection for flow rate, level, temperature, pressure, etc.

1 Overview of the PCS 7 Water Templates

Name	Function
WCMT_MonAnalog0803	Analog monitoring 8 limits for flow rate, level, temperature, pressure, etc.
WCMT_MonDigital03	Digital monitoring
WCMT_MonDigital0803	Digital monitoring with 8 binary inputs
WCMT_Mot2Spd_FbCom03	Motor with two speeds and one direction of rotation
WCMT_Mot2Spd_FbMMS03	Motor with two speeds and one direction of rotation with fieldbus connection to SIMOCODE pro V
WCMT_MotLean_FbCom03	Motor with one speed and one direction of rotation
WCMT_MotLean_FbMMS03	SIMOCODE pro V motor with one speed and one direction of rotation with fieldbus connection
WCMT_MotRev_FbCom03	Motor with one speed and two directions of rotation
WCMT_MotRev_FbMMS03	Motor with one speed and two directions of rotation with fieldbus connection to SIMOCODE pro V
WCMT_MotSpdCon_FbCom03	Motor via frequency converter with continuously adjustable speed and two directions of rotation
WCMT_MotSpdCon_FbDrv03	Motor via frequency converter with continuously adjustable speed and two directions of rotation with fieldbus connection to SINAMICS G120
WCMT_OpAn03	Control of an analog value via interconnection or faceplate operation (setpoint)
WCMT_OpD03	Control of a digital value via interconnection or faceplate operation (command)
WCMT_OpD0303	Control of a digital value via interconnection or faceplate operation
WCMT_OpTrig03	Control of a digital value via interconnection or faceplate operation as a pulse signal (On button)
WCMT_PAC03	Monitoring and acquisition of data from SENTRON PAC devices
WCMT_ParaCtrlMem03	Display and edit parameters. Management of parameter sets
WCMT_PC_BusBar03	PCS 7 Power Control BusBar
WCMT_PC_Feeder03	PCS 7 Power Control Feeder
WCMT_PC_Feeder_2CB03	PCS 7 Power Control Feeder 2CB
WCMT_PC_Line03	PCS 7 Power Control Line
WCMT_PC_MEAS03	PCS 7 Power Control Measuring Point
WCMT_PC_Sync03	PCS 7 Power Control Device Synchronization
WCMT_PC_Trafo03	PCS 7 Power Control Transformer
WCMT_PIDConL03	Continuous PID controller
WCMT_PIDStepConL03	PID step controller

1 Overview of the PCS 7 Water Templates

Name	Function
WCMT_Polygon03	Operator-controllable polygon with 8 turning points
WCMT_SITOP_PSU86_1003 ²	Monitoring of the PSU 8600 power supply system with one output
WCMT_SITOP_PSU86_4003 ²	Monitoring of the PSU 8600 power supply system with four outputs
WCMT_SITOP24V_Mod_03 ²	Monitoring of SITOP 24 V power supplies; redundancy, selectivity, buffering
WCMT_SitrHR200_Fb03	SITRANS HR200 Level measurement (ultrasonic)
WCMT_SitrLR2xx_Fb03	SITRANS LR2xx Level measurement (pulse radar)
WCMT_SitrMAG6000_Fb03	SITRANS MAG6000 flow rate measurement
WCMT_SitrP_Fb03	SITRANS P Pressure transducer
WCMT_SitrTH_Fb03	SITRANS TH measuring transducer
WCMT_SPCurve03	Setpoint curve block, programmable up to 96 turning points
WCMT_SplitrangeContr03	Controls up to four drives or motorized sluices via a PID controller
WCMT_TimeSched03	Week timer with 8 switching points
WCMT_UsrM03	Multi-user block via 8 operation levels with one control authorization "1 of n"
WCMT_Vlv2Way_FbCom03	Manifold valve
WCMT_VlvAnalog_FbCom03	Valve with analog actuating signal
WCMT_VlvLean_FbCom03	Valve with two end positions and no intermediate position
WCMT_VlvLean_FbMMS03	Valve with two end positions and no intermediate position, with fieldbus connection to SIMOCODE pro V
WCMT_VlvMotor_FbCom03	Motorized sluice
WCMT_VlvMotor_FbMMS03	Motorized sluice with fieldbus connection to SIMOCODE pro V
WCMT_VlvPos_FbCom03	Motorized sluice with analog position monitoring
WCMT_VoteAnL03	Averaging of up to 8 measured values with validation and extraction of minimum and maximum valid value

² This WCMT was created with the SITOP library V3.3. The SITOP blocks correspond to the block version V1.1.

1.5.3 Engineering with Control Module technology

By using water-specific control module types (WCMT in this example), different types of instances can be created in the project. An instance is a copy of the type. It is adapted to the respective requirements by activating optional blocks. Necessary changes, such as extensibility with additional message or channel blocks, 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 at the following link:
<https://support.industry.siemens.com/cs/ww/en/view/109475748>

NOTE

The application example "PCS 7 Water Unit Template – Efficient [sic] congestion channel management" gives you an overview of how Water Unit Templates can be used in a project.

The application example is available at the following link:
<https://support.industry.siemens.com/cs/ww/en/view/109481487>

For more examples of wastewater applications with WCMTs, refer to the Appendix in chapter 5.4.

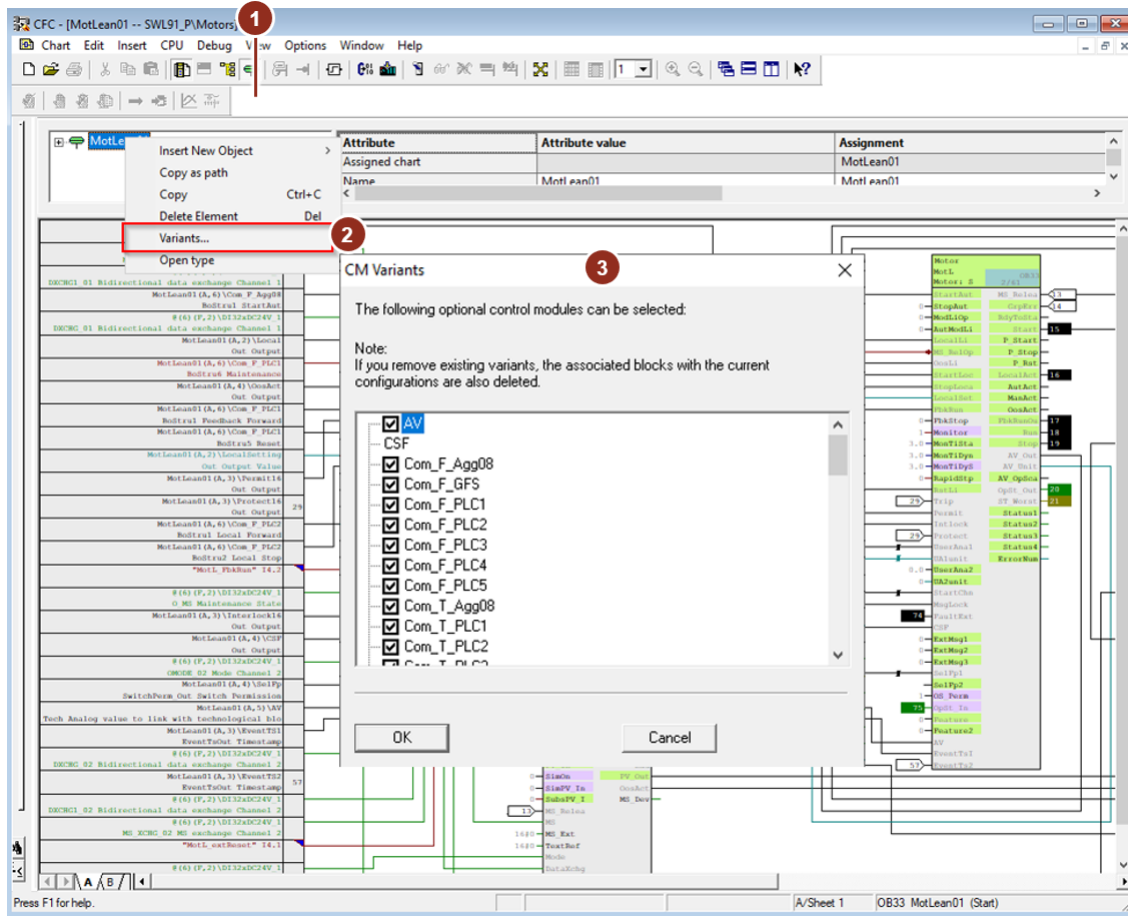
Selecting a variant

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 I/Os 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 1-10



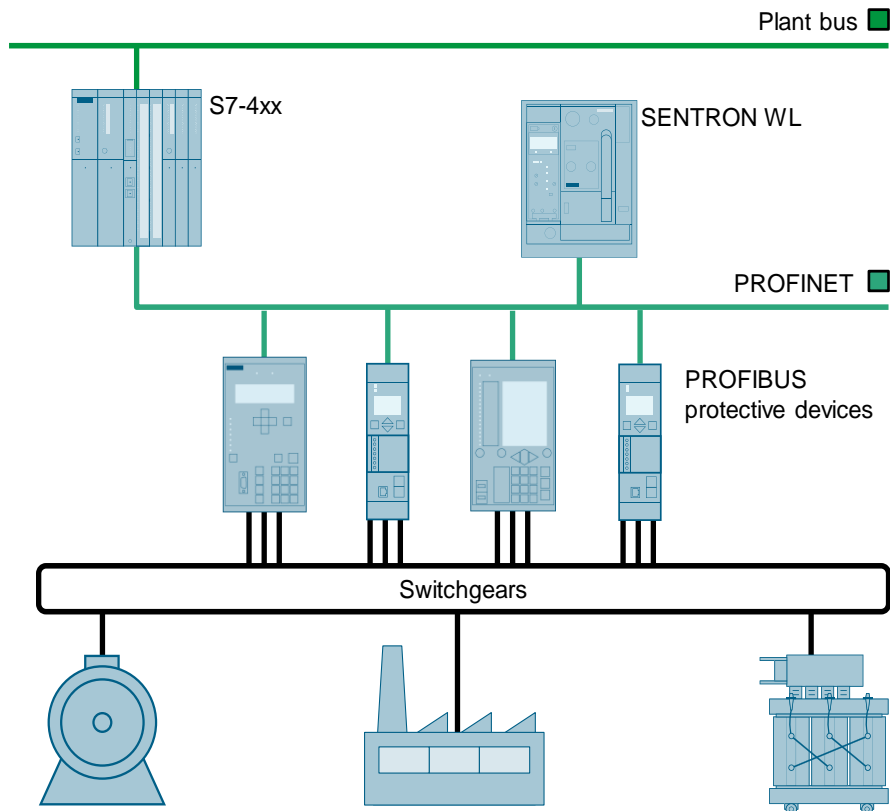
1.6 Energy management solutions

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. Connection to automation systems is established with communication modules and software modules.

SIEMENS products and solutions not only comply with the IT security requirements according to IEC 62443, they also meet the requirements from the German Federal Office for Information Security (BSI) and the legal stipulations on critical infrastructure (KRITIS).

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

Figure 1-11



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 personnel protection. Furthermore, the SIVACON LR busbar trunking system guarantees optimal and safe power conveyance in aggressive wastewater atmospheres; it features high short-circuit resistance 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 and innovative multifunction measuring 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. The SIPROTEC 5 device family integrates all the protection,

control, measurement, and automation functions into one device. It can be connected via PROFIBUS DP.

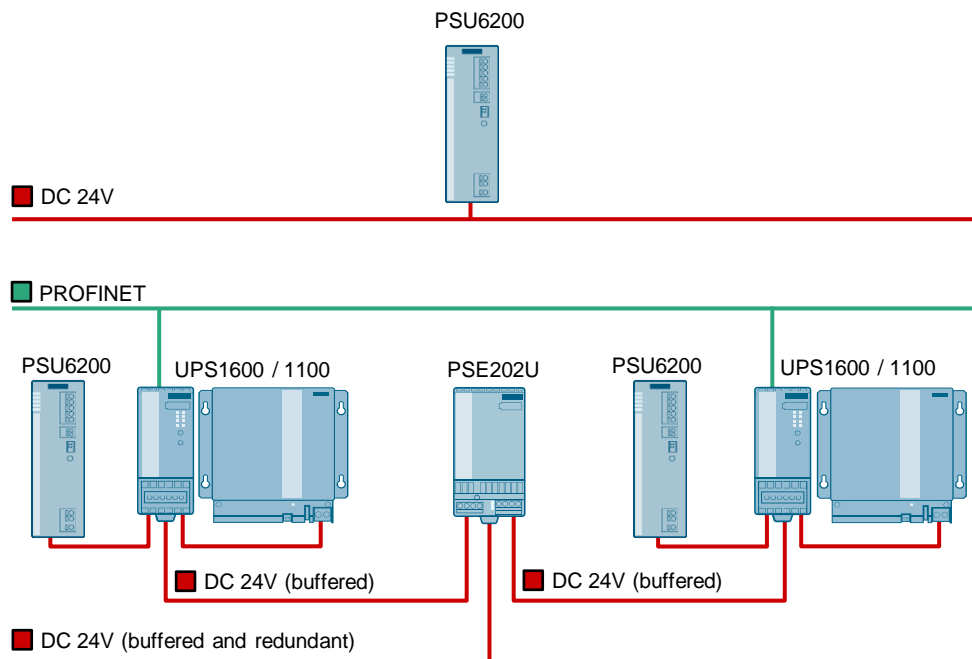
With the SIPROTEC 5 version, you get access to a new, highly modular and therefore flexible generation of intelligent, digital field devices. SIPROTEC 5 offers a comprehensive product range with modular elements for every application and requirement. It can be connected via PROFINET.

1.7 Solutions for 24V power supply

SITOP modular

The following schematic diagram shows the base 24V power supply up to the uninterruptible redundant 24V power supply:

Figure 1-12



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

- SITOP PSU6200: 1- and 3-phase 24 V power supplies
- SITOP PSE202U: Redundancy module for decoupling SITOP PSU6200
- 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

SITOP PSU6200

The following schematic diagram shows the 1- or 3-phase do-it-all "SITOP PSU6200" power supply with redundancy and selectivity.

Figure 1-13

PSU6200 / RED1200 / PSU6200 / SEL1200



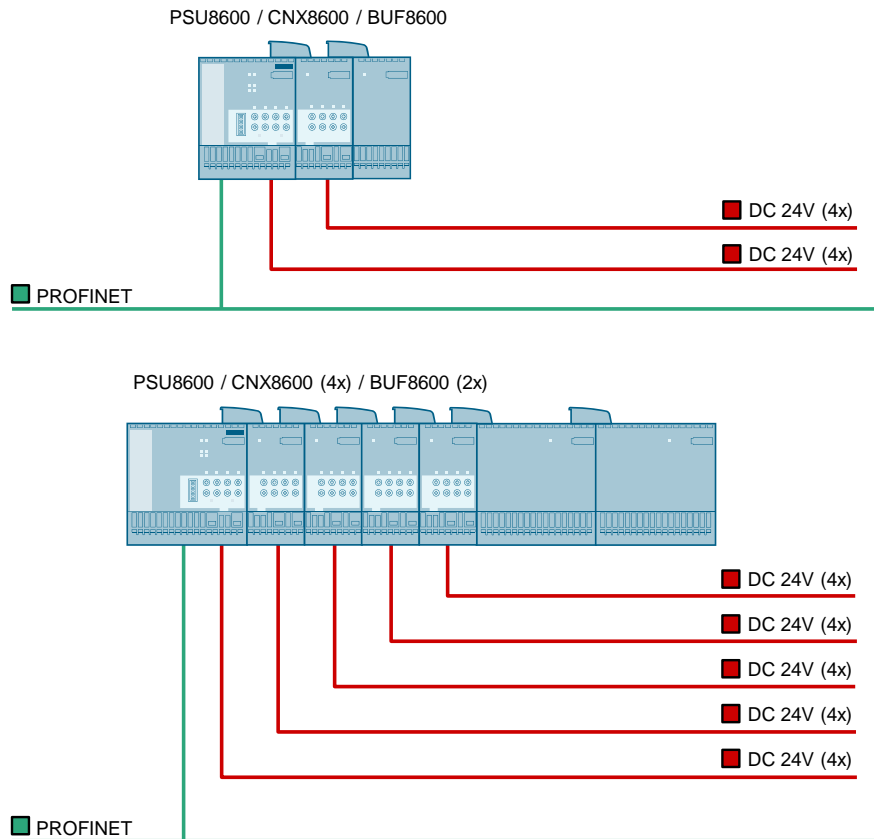
The SITOP PSU6200 is the do-it-all power supply.

- PSU6200: the 1- or 3-phase power supply with a wide range of use cases and currents, from 12V/2A to 24V/20A
- RED1200: The redundancy module for decoupling two "SITOP 6200" power supplies
- SEL1200/1400: Selectivity module with 8 feeders and switching or limiting characteristic

SITOP PSU8600 power supply system

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

Figure 1-14



SITOP PSU8600 is the power supply system with PROFINET.

- PSU8600: the 3-phase power supply with 20A or 40A and one or four selective feeders
- CNX8600: the expansion module with four selective feeders each
- BUF8600: the buffer module for bridging short to moderate power outages
- UPS8600: the UPS module for bridging moderate grid outages on the order of minutes to hours at full system power
- BAT8600: the battery buffer module in the event of grid outage

NOTE

The faceplate and icons used in the "WCMT_SITOP" templates are described in the respective profile. The profiles are part of this application example; you can obtain them from your regional sales partner.

In the chapter entitled [3 WCMT / \(WEMT\) profiles](#) you will find the description of a profile along with an example.

Further information, application examples and libraries can be found at the links in the following Table:

Table 1-10

No.	Article
/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

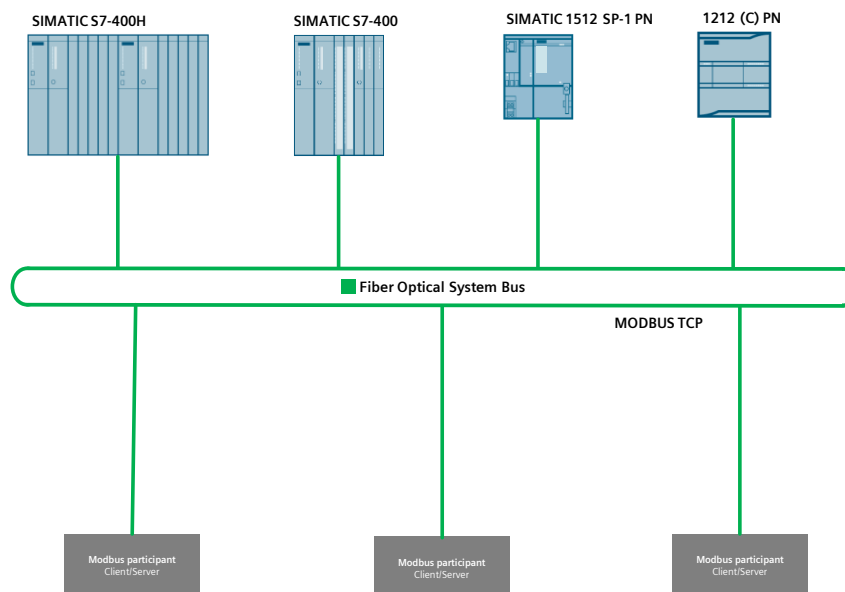
1.8 Solutions with Modbus/TCP

Modbus is a worldwide communication protocol that is open to all users and supported by many manufacturers.

The requirement to couple third-party systems to SIMATIC PCS 7 via Modbus is especially relevant when:

- expanding or modernizing existing plants
- coupling controllers and systems of different manufacturers (and also when constructing new systems)

Figure 1-15



Modbus is based on a client-server architecture (also called master/slave architecture), which can be implemented within PCS 7 in various ways.

The implementation is done with a Modbus/TCP library available in different variants. You can use it to integrate external systems into PCS 7 via Modbus/TCP.

In doing so, you can significantly reduce your engineering effort as well as increase performance. You can use this solution for both new configurations as well as for integration into existing projects. The required hardware and software products are all made by Siemens and guarantee the accustomed compatibility, up-to-dateness and upgrade options. Not only the PCS 7 standard but also the Modbus standard are accounted for without exception.

When using the Modbus library you also get the following benefits:

- Easy connection of systems of different manufacturers to PCS 7 via Industrial Ethernet
- Gradual and therefore low-cost expansion or modernization of existing systems over the entire system life cycle
- Assured Siemens support
- No specific Modbus knowledge required
- Engineering in the accustomed PCS 7 environment
- Function block library with online help in German and English

You can find additional information on Modbus/TCP in the following articles:

Modbus/TCP-standardized and redundant communication between SIMATIC PCS 7 and third-party systems

<https://support.industry.siemens.com/cs/ww/en/view/75867147>

Add-on blocks for Modbus/TCP communication

<https://support.industry.siemens.com/cs/ww/en/view/62830463>

Creation of data blocks for Modbus/TCP communication

<https://support.industry.siemens.com/cs/ww/en/view/60735352>

NOTE

1.9 Solutions for Package Unit connection

Appropriate interfaces are required for conventional communication with Package Units. The associated signals and parameters must be laboriously interconnected with one another and transmitted by means of a connection method (MPI, PROFIBUS, PROFINET, Industrial Ethernet, Modbus/TCP).

The extended WCMTs give you the first prefab interfaces which you can easily adapt to your requirements or adopt unchanged. They also reduce your engineering effort. Here, it does not matter which connection method the user chooses. This ensures that a continuous standardized interconnect is established from Package Unit communication – via the send/receive field of the coupling method – all the way to the respective PCS 7 V9.1 instance.

Figure 1-16 Structure connection via the communication interface from the Package Unit

WCMT_MotLean_FbCom		
In	ComStrucOut_FromPLC_Bit00-05	Bit 00 WCMT_MotLean_FbCom\N\FbkFwd
		Bit 01 Reserved
		Bit 02 Reserved
		Bit 03 Reserved
		Bit 04 WCMT_MotLean_FbCom\N\RstLi
	Bit 05 WCMT_MotLean_FbCom\N\MS_RelOp (Maint)	
In	ComStrucOut_FromPLC_Bit06-11	Bit 06 WCMT_MotLean_FbCom\N\LocalFwd
		Bit 07 WCMT_MotLean_FbCom\N\LocalStop
		Bit 08 Reserved
		Bit 09 WCMT_MotLean_FbCom\Local_0_Pos_Act\In01 (RemoteHW)
	Bit 10 WCMT_MotLean_FbCom\Local_0_Pos_Act\In02 (LocalHW)	
	Bit 11 WCMT_MotLean_FbCom\Local_0_Pos_Act\In05 (RemoteSW)	
In	ComStrucOut_FromPLC_Bit12-17	Bit 12 WCMT_MotLean_FbCom\Local_0_Pos_Act\In06 (LocalSW)
		Bit 13 Reserved
		Bit 14 Reserved
		Bit 15 Reserved
		Bit 16 WCMT_MotLean_FbCom\Protect16\In01 (TripMMS)
	Bit 17 WCMT_MotLean_FbCom\Protect16\In02 (TripCF)	
In	ComStrucOut_FromPLC_Bit18-23	Bit 18 WCMT_MotLean_FbCom\Protect16\In03 (TripOverTemp)
		Bit 19 WCMT_MotLean_FbCom\Protect16\In04 (Mech_Prot_AH)
		Bit 20 WCMT_MotLean_FbCom\Protect16\In05 (PpProt_AL)
		Bit 21 WCMT_MotLean_FbCom\Interlock16\In03 (ProcProtect)
		Bit 22 WCMT_MotLean_FbCom\Interlock16\In04 (NetPower_AL)
		Bit 23 WCMT_MotLean_FbCom\Interlock16\In05 (EmergStop)
In	ComStrucOut_FromPLC_Bit25-30	Bit 25 Reserved
		Bit 26 Reserved
		Bit 27 Reserved
		Bit 28 Reserved
		Bit 29 Reserved
		Bit 30 Reserved

1.10 Solutions with Process Online Analysis

The SC controllers with sensors from the Hach product portfolio provide you with the worldwide largest selection of online analysis for water and wastewater.

Figure 1-17



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The following parameters are covered:

- pH, redox potential, conductivity (conductive), conductivity (inductive)
- Oxygen (LDO), oxygen (galvanic), ozone
- Chlorine (free), chlorine dioxide
- Superfine clouding, clouding, solids, sludge concentration, sludge level
- Ammonium, nitrate
- Phosphate (ortho), phosphate (total)
- SAK, TOC
- mA inputs, digital inputs

SC controllers are available with various features and can be flexibly configured according to your specifications and requirements:

The SC 1000 controller can integrate up to 8 sensors on one process tag and it can be expanded with up to 32 sensors in the network. It furthermore allows for the integration of PROFIBUS DP communication, including existing 0/4-20mA signals via digital inputs/outputs to a SIMATIC CPU S7-1500, S7-300, S7-IM 151-8, S7-400 or PA CPU 410.

NOTE

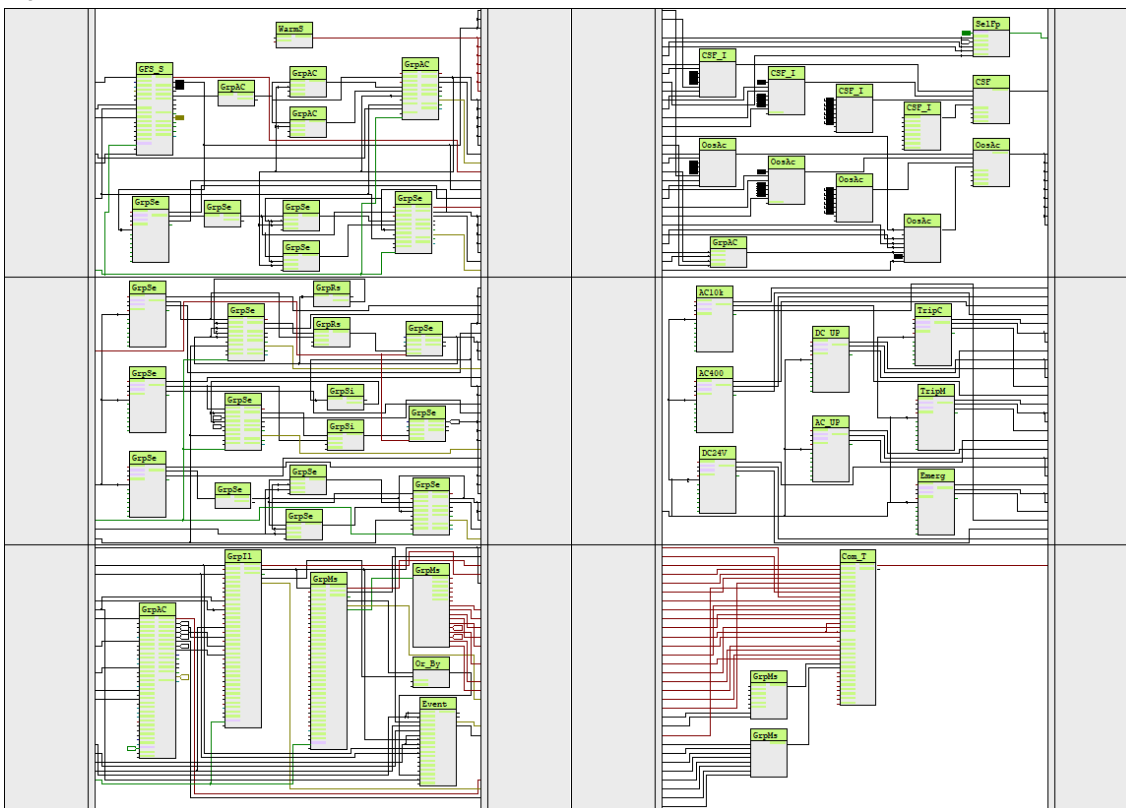
For more information on integrating HACH SC 1000 controllers via PROFIBUS DP (including GSDML files) with PCS 7, please refer to the German-language download area on the following website:
<https://de.hach.com/bus-profibus>

1.11 WCMT Global Function Services

The WCMT Global Function Services ("WCMT_GFS03") is intended to be used as the central CPU function of a Unit or plant. The "WCMT_GFS03" can be used for the following applications:

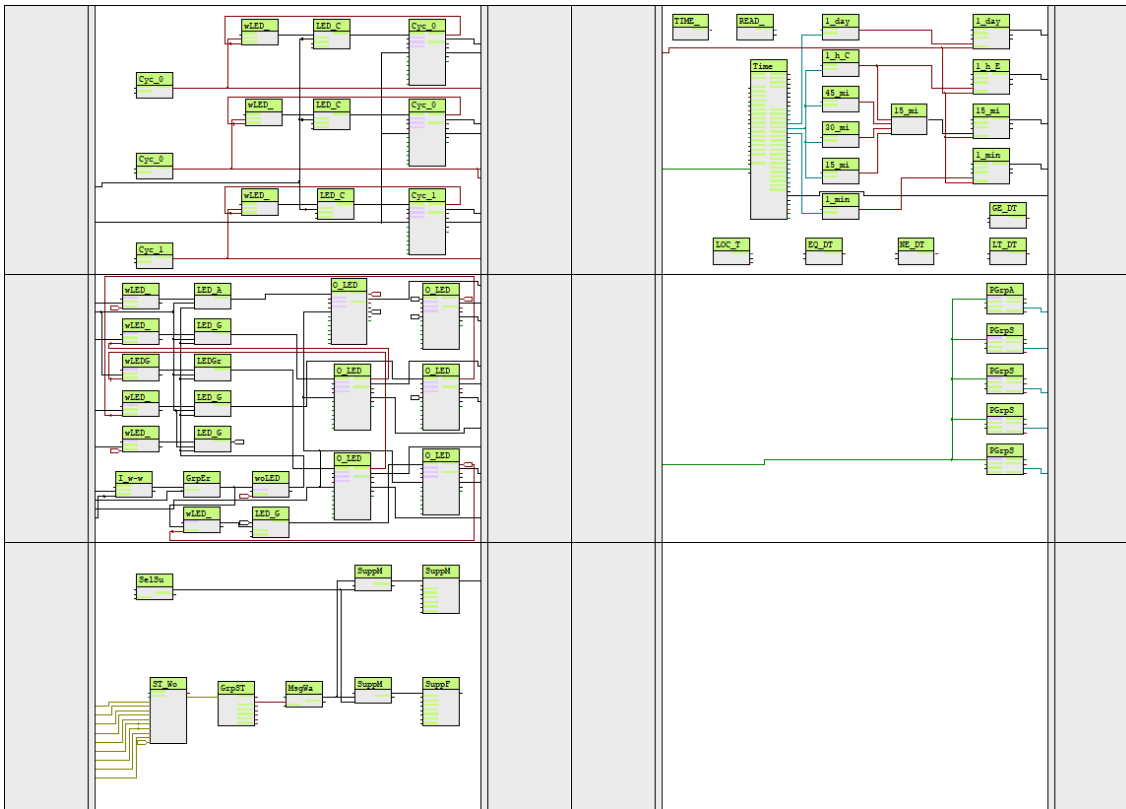
- Warm-start initialization after CPU start
- "Feed-in" feedback for AC10kV, AC400V, AC230V, DC24V, UPS on
- Switch on/off the "Plant on" function either centrally from the OS or on-site.
- Actuate Unit/plant from on-site control, panel or OS: Operating mode "AUTO"
- Actuate Unit/plant from on-site control, panel or OS: "RESET"
- Actuate Unit/plant from on-site control, panel or OS: "Check lights"
- Actuate Unit/plant on-site or via OS: Turn "Plant occupied" on/off

Figure 1-18



- Configure 0.25Hz, 0.5 Hz and 1 Hz CPU cycle times
- "Plant occupied" / "RESET" / "General fault" indicator lights
- Higher-level message overload monitoring in event of power loss
- Extended time pulses for 1 min / 15 min / 1 h / 1 day
- CPU clock trigger configurable via PCS 7 faceplate
- Reserved space for water-specific messages
- WCMT-internal prepared structure connection to all WCMTs

Figure 1-19



Besides the far-reaching applications, this WCMT provides the following special functions.

This WCMT can be used either for just one part of the plant (one CPU) or for multiple parts of the plant (multiple CPUs) via AS-AS communication (see [1.11.6 CFC Chart Partition A/Sheet 6](#)).

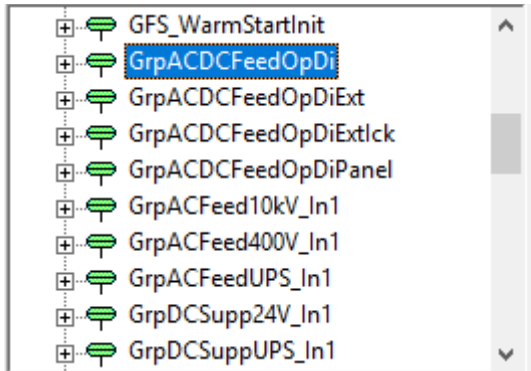
Another feature of this WCMT is the ability to control all functions of the WCMT both on site as well as on operator stations. The typical is configured with the default settings so that an operator with the correct operator authorizations is able to grant operator permissions. If an additional anti-intruder requirement should mean that on-site operation only be possible once the Unit or plant shows "Plant occupied", then the permissions can be assigned both on site as well as by the operator. This special function is especially helpful if on-site work has been performed at a plant but the operator permissions were not revoked when personnel left the plant.

Note To comply with such a requirement, the input tag "EN" must be used at all required "PCS7DiIn" driver blocks; it must be connected with the "Plant occupied" function.

The naming convention of the various technological types represents another particularity. To streamline training and handling as much as possible, the names already indicate the necessary work steps.

Taking the example of "GrpSegAutoOpDi" (**Group/Segment AUTO OpDi**), the parameter assignment of this function starts at the "OpDi" block. By selecting each additional variant, the engineer can use the names to proceed to the driver block of the on-site control. In doing so, the engineer has the ability at any time to integrate custom solutions using prefab functions or functions he creates himself.

Figure 1-20

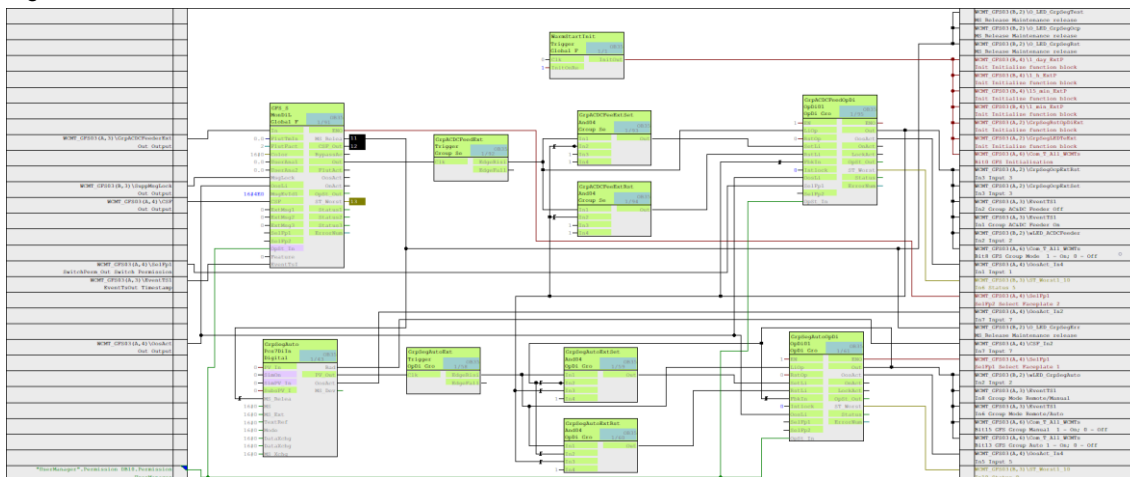


1.11.1 CFC Chart Partition A/Sheet 1

Four functions are shown in CFC Chart Partition A/Sheet 1:

1. Warm-start initialization after CPU start
2. "Feed-in" feedback for AC10kV, AC400V, AC230V, DC24V, UPS on
3. Switch on/off the "Plant on" function either centrally from the OS or on-site.
4. Actuate Unit/plant from on-site control or OS: Turn on operating mode "AUTO"

Figure 1-21



The warm-start initialization makes it possible to use the <Init> input tag to reset APL blocks such as timers, triggers, RS flip-flops and memory after the CPU starts. The initialization is

runs via the structure block "Com_T_All_WCMTs". Activating the indicator light function in the initialized WCMTs fully interconnects the "Check lights" function.

This function is optionally assigned a parameter. It can therefore be selected as a variant when initializing the respective WCMTs.

The "Plant occupied" function for a group (Unit) / plant can switch the plant/Unit to a special monitoring and/or control mode either from an on-site station or via OS control. Communication with other WCMTs runs via the structure block "Com_T_All_WCMTs".

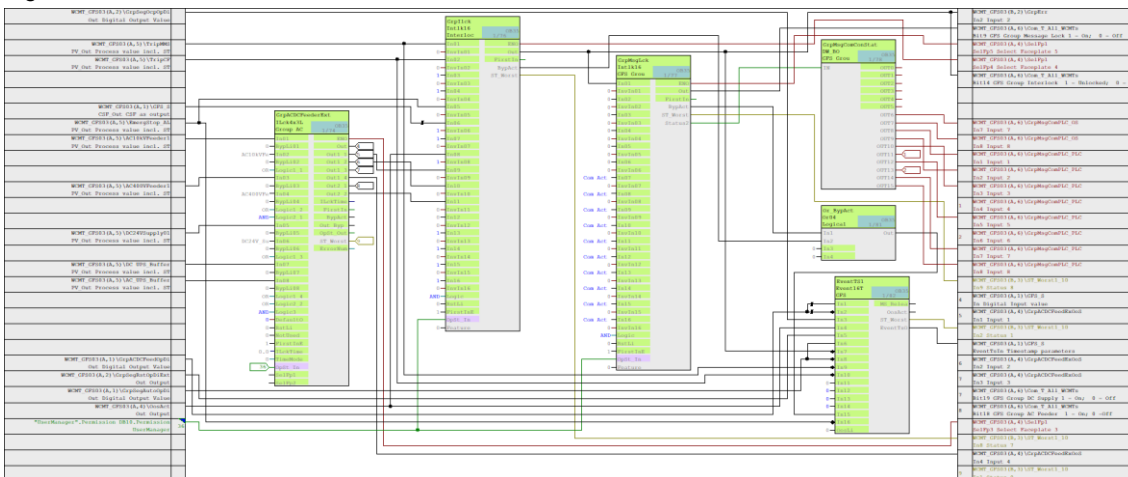
This function is optionally assigned a parameter. It can therefore be selected as a variant when initializing the respective WCMTs.

1.11.3 CFC Chart Partition A/Sheet 3

CFC Chart Partition A/Sheet 3 shows six functions:

1. Generation of a catch-all message from "Feed" AC 10kV, AC 400V, AC 230V, DC 24V, UPS AC and UPS DC accounting for battery buffers (single line). Redundancy ready as reserve.
2. Supervening INTERLOCK in case of failure of DC and/or AC feeds.
3. Supervening "Message Lock" in case of failure of DC and/or AC feeds to suppress message overloads.
4. CPU communication monitoring with PCS 7 OS server.
5. CPU Communication monitoring with CPU(s) in data cross-traffic.
6. Message block records and processes additional operational messages and faults from "WCMT_GFS03".

Figure 1-23



The "ILck4x3L" block "GrpACDCFeederExt" from the Industry Library can bundle a maximum of eight input signals. It is used for calculation of a standardized interlock that can be displayed on the OS. These input signals are linked with each other in groups across at most 3 layers using selectable binary logic. Any group in the logic can be linked with AND, OR or XOR. The output signals from the various groups can be read individually, but also as a catch-all message from all groups.

The structures and logic defined here in the block "GrpACDCFeederExt" can be perused along with examples in the Industry Library V9.1.

This function cannot be selected or deselected as a variant.

Note

For more information on the SIMATIC PCS 7 Industry Library V9.1, refer to this link:
<https://support.industry.siemens.com/cs/ww/en/view/109805069>

The higher-level INTERLOCK "GrpIck" monitors the individual feeds, from medium-voltage lines to the DC 24 V controller voltage. In the event of a fault, all instantiated WCMTs in a project (for example drives, valves and other process activities) can be quickly shut down. This measure serves to counter in advance any flood of messages from response errors. This INTERLOCK acts like a higher-level emergency stop.

This function cannot be selected or deselected as a variant.

Complementing the higher-level "GrpIck" INTERLOCK, the "GrpMsgLck" INTERLOCK can prevent a message overload in the event of power loss.

This function cannot be selected or deselected as a variant.

The communication from a CPU to the PCS 7 OS server(s) is one of the most important connections and must be monitored continuously for messages.

Should a communication failure occur between these two process nodes, secure plant operation can be resumed at another control location (Comfort Panel or on-site control station).

The CPU can initiate an automatic switchover when the right message occurs. This switchover is made possible through the communication between "WCMT_GFS03" and "WCMT_UsrM03". Communication is analyzed with the help of the <Status2> output bit from the "GrpMsgLck" INTERLOCK block and processed in a comparator block, "GrpMsgLkCoPLC_OS".

This function is optionally assigned a parameter. It can therefore be selected as a variant when initializing the respective WCMTs.

Similar behavior can also occur in communication monitoring between one CPU and another CPU or CPUs in data cross-traffic. In most cases, plant messages, measurement values and limit values are exchanged among Units. In case of interruptions to communication, each of the two or more CPUs must initiate a switchover to a secure plant status so that inter-process functions can be sustained. To achieve this high level of availability, however, it is necessary to integrate additional hardware alternatives into the overall plant concept.

This function can be selected as an optional variant.

All new operational messages and faults from "WCMT_GFS03" are recorded and processed by the message block "EventTS1". When working with types, the user then decides in the object properties of the blocks which logging area the information will be saved to.

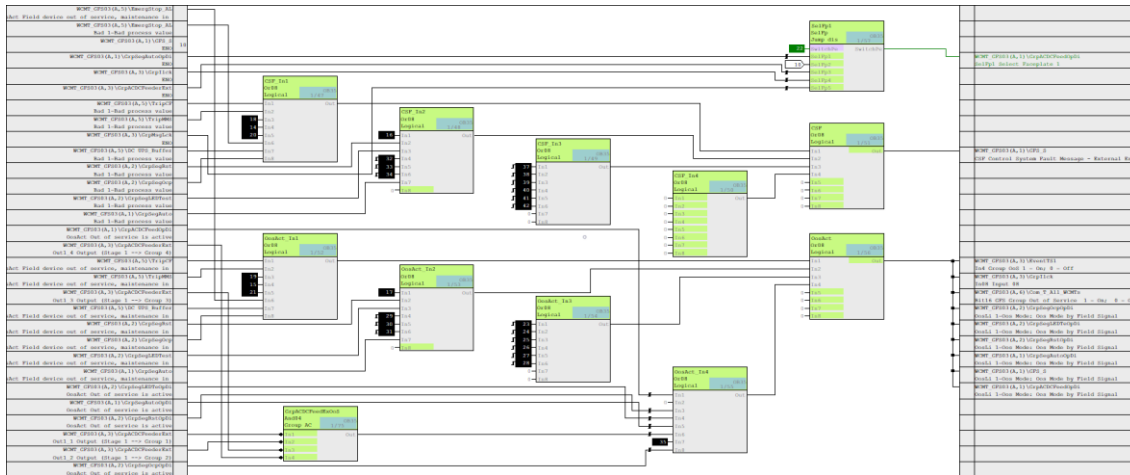
This function is optionally assigned a parameter. It can therefore be selected as a variant when initializing the respective WCMTs.

1.11.4 CFC Chart Partition A/Sheet 4

CFC Chart Partition A/Sheet 4 shows three functions:

1. Faceplate Jumper provides 5 more sub-faceplate connections.
2. Catch-all message summary Out of Service (OoS)
3. Catch-all message summary Signal Quality (Bad)

Figure 1-24



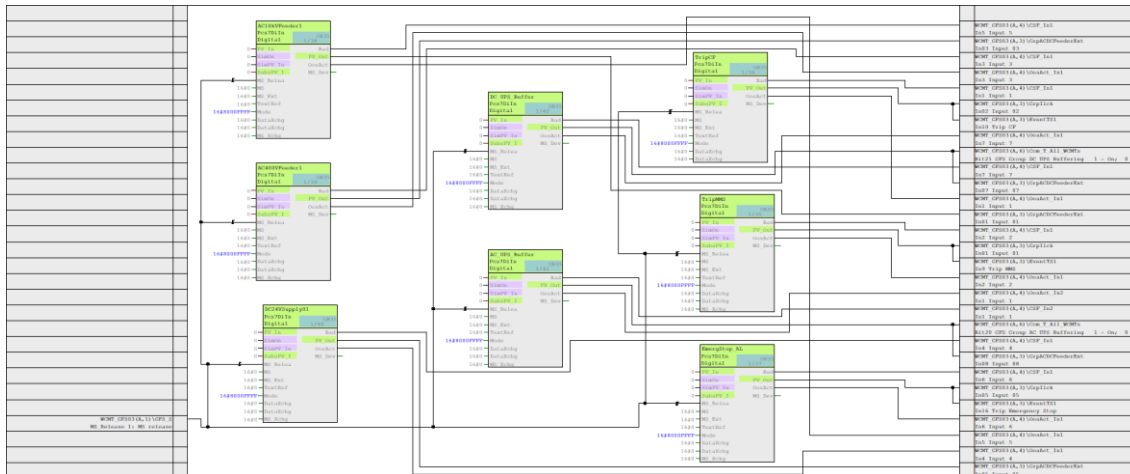
All three of the aforementioned functions are existing standard functions of every one of the WCMTs. They do not require further description here.

1.11.5 CFC Chart Partition A/Sheet 5

CFC Chart Partition A/Sheet 5 provides the most important operational and fault messages via PCS 7 default driver blocks:

1. AC 10kV Feeder 1 1/0 = On/Off
2. AC 400V Feeder 1 1/0 = On/Off
3. DC 24V Supply 1 1/0 = On/Off
4. DC uninterruptible power supply (UPS) 0/1 OK / Alarm
5. AC uninterruptible power supply (UPS) 0/1 OK / Alarm
6. Trip CF 1/0 = OK/tripped
7. Trip MMS 1/0 = OK/tripped
8. Emergency Stop 1/0 = OK/tripped

Figure 1-25



All of the points enumerated above are part of the interlock and messaging components of "WCMT_GFS03" and will not be described in more detail.

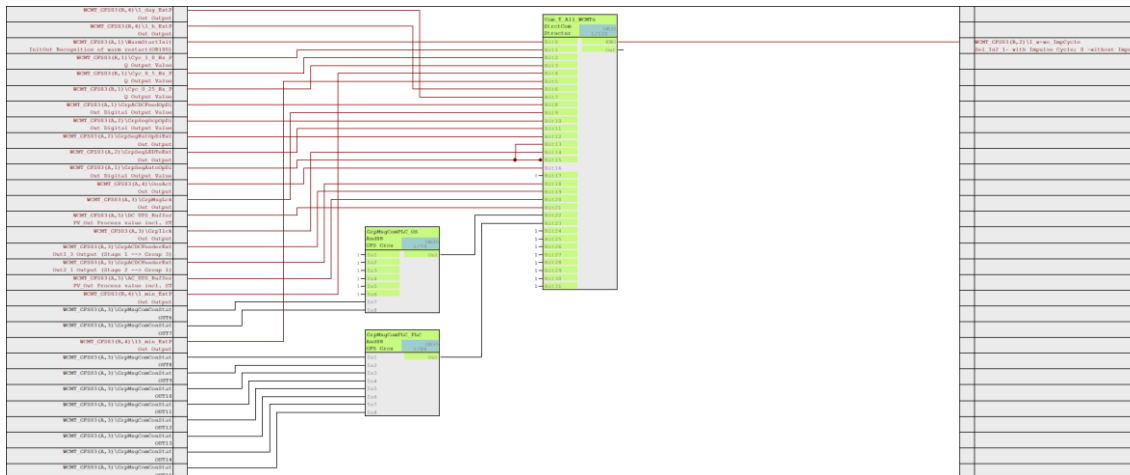
These functions are optionally assigned parameters. They can therefore be selected as a variant when initializing the respective WCMTs.

1.11.6 CFC Chart Partition A/Sheet 6

CFC Chart Partition A/Sheet 6 shows one function:

1. WCMT-internal prepared structure connection to all WCMTs via structure block "Com_T_All_WCMTs"

Figure 1-26

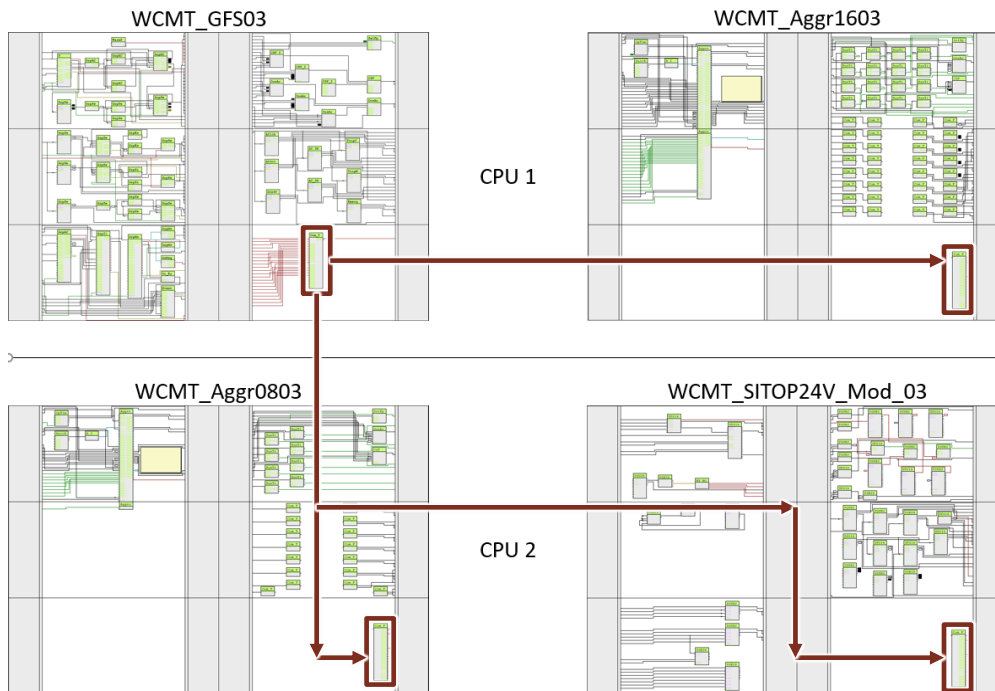


The "StrctCom" structure block "Com_T_All_WCMTs" centrally compiles all required industry-specific messages in one 32-bit structure type. A connection must be established between the output tag <Out> and the "StrctDeC" structure block "Com_F_GFS" input tag <In> on the desired WCMT. This structure Decomposer divides the 32-bit structure type into 32 individual binary outputs. Thanks to this function, this WCMT is able to communicate across CPUs. Accordingly, it is not necessary to use AS-AS communication.

This function is already pre-parameterized and cannot be selected as an option.

The structure block "Com_F_GFS" is selectable and pre-parameterized via the variant of the same name in the WCMTs.

Figure 1-27



This Table shows all input interconnections for the 32-bit-long structure types of the structure block "Com_T_All_WCMTs".

Table 1-11

Bit 1... 31	Interconnection	Value	Inversion Y/N
Bit 0	WCMT_GFS03\WarmStartInitiai.InitOut	1 -> Warmstart initialization	N
Bit 1	WCMT_GFS03\Cyc_1_0_Hz_P.Q	1 -> time-dependent	N
Bit 2	WCMT_GFS03\Cyc_0_5_Hz_P.Q	1 -> time-dependent	N
Bit 3	WCMT_GFS03\Cyc_0_25_Hz_P.Q	1 -> time-dependent	N
Bit 4	WCMT_GFS03\1_min_ExtP.Out	1 -> time-dependent	N
Bit 5	WCMT_GFS03\15_min_ExtP.Out	1 -> time-dependent	N
Bit 6	WCMT_GFS03\1_h_ExtP.Out	1 -> time-dependent	N
Bit 7	WCMT_GFS03\1_day_ExtP.Out	1 -> time-dependent	N
Bit 8	WCMT_GFS03\GrpACDCFeedOpDi.Out	1 -> logic-dependent	N
Bit 9	WCMT_GFS03\GrpMsgLck.Out	1 -> Message INTERLOCK	N
Bit 10	WCMT_GFS03\GrpSegOcpOpDi.Out	1 -> logic-dependent	N
Bit 11	WCMT_GFS03\GrpSegLEDTeExt.Out	1 -> LED test	N

1 Overview of the PCS 7 Water Templates

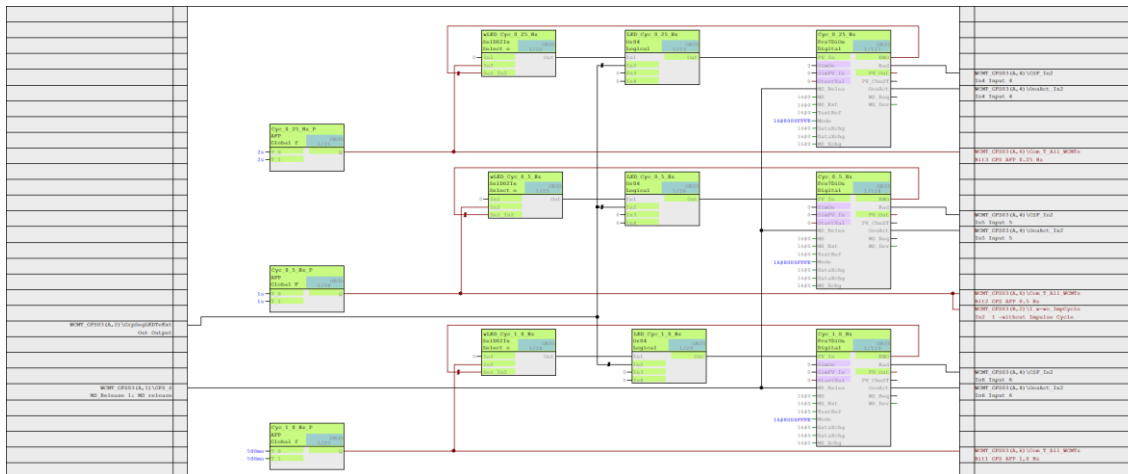
Bit 1... 31	Interconnection	Value	Inversion Y/N
Bit 12	WCMT_GFS03\GrpSegRstOpDiExt.Out	1 -> Reset Internal Operations	N
Bit 13	WCMT_GFS03\GrpSegAutoOpDi.Out	1 -> AUTO Mode	N
Bit 14	WCMT_GFS03\GrpIlck.Out	1 -> higher-level INTERLOCK	N
Bit 15	WCMT_GFS03\GrpSegAutoOpDi.Out	1 -> AUTO Mode off	Y
Bit 16	WCMT_GFS03\GrpACDCFeedOpDi.OosAct	1 -> Plant On	N
Bit 17	-	0	N
Bit 18	WCMT_GFS03\GrpACDCFeederExt.Out2_1	1 -> ILck4x3L Out 1 higher-level INTERLOCK	N
Bit 19	WCMT_GFS03\GrpACDCFeederExt.Out2_2	1 -> ILck4x3L Out 2 higher-level INTERLOCK	N
Bit 20	WCMT_GFS03\AC_UPS_AL.PV_Out	1 -> AC Alarm	N
Bit 21	WCMT_GFS03\GrpACDCFeederExt.Out1_4	1 -> ILck4x3L Out 4 higher-level INTERLOCK	N
Bit 22	WCMT_GFS03\GrpMsgLkCoPLC_OS.EQ	1 -> Signal ok between PLC and OS	N
Bit 23	WCMT_GFS03\GrpMsgLkCoPLC_PLC.GE	1 -> Signal ok between PLC and PLC	N
Bit 24	-	1	N
Bit 25	-	1	N
Bit 26	-	1	N
Bit 27	-	1	N
Bit 28	-	1	N
Bit 29	-	1	N
Bit 30	-	1	N
Bit 31	-	1	N

1.11.7 CFC Chart Partition B/Sheet 1

CFC Chart Partition B/Sheet 1 shows three typical blink cycle functions:

1. Blink frequency 0.25 Hz
2. Blink frequency 0.50 Hz
3. Blink frequency 1.00 Hz

Figure 1-28



All three blink frequencies offer additional functions:

- Can be switched off at "SelD02In" block via input <Sel_In2> = 0 if no "Pcs7DiOut" output driver block is activated as an option.
- Upon activation of the "Check lights" signal, the alternating blink cycle switches to solid for 8 seconds.
- The optional activation of the output driver block "Pcs7DiOut" via the technological I/Os will propagate the respective blink frequency of the WCMT to the digital output I/Os. It can be interconnected with indicator lights from existing hardware solutions, for example. The engineer no longer has to perform additional parameter assignment at the input tag <Sel_In2> of the "SelD02In" block since the <ENQ> output tag of the output driver block "Pcs7DiOut" automatically enables the blink contact.
- The respective blink frequency is always on standby inside the CPU and cannot be switched off.

These blink frequency functions are optionally selectable as a variant.

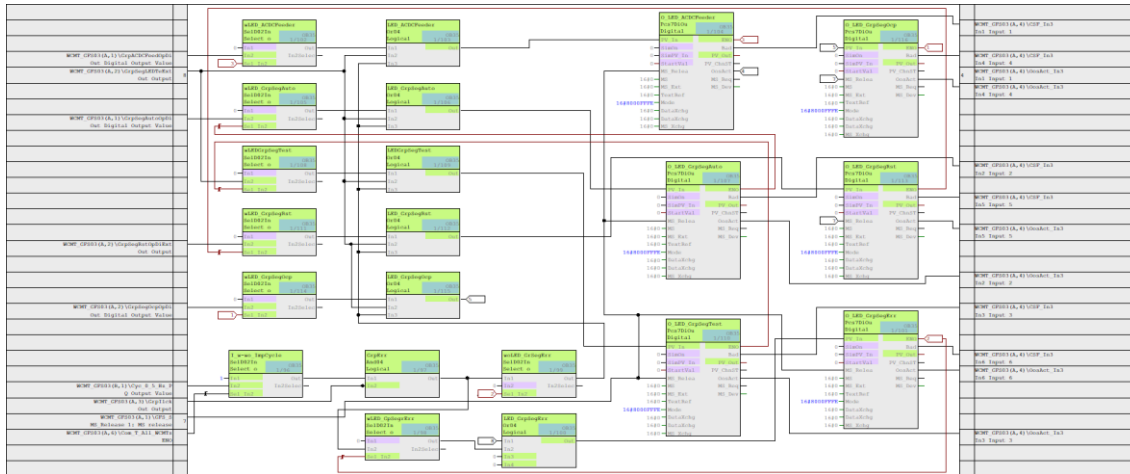
Note

The three provided blink cycles can be modified with respect to their frequency at any time and on a user-specific basis in the master data library.

1.11.8 CFC Chart Partition B/Sheet 2

CFC Chart Partition B/Sheet 2 shows on-site monitoring functions in the form of indicator lights for Chart Partitions A1 through A3 of "WCMT_GFS03":

Figure 1-29

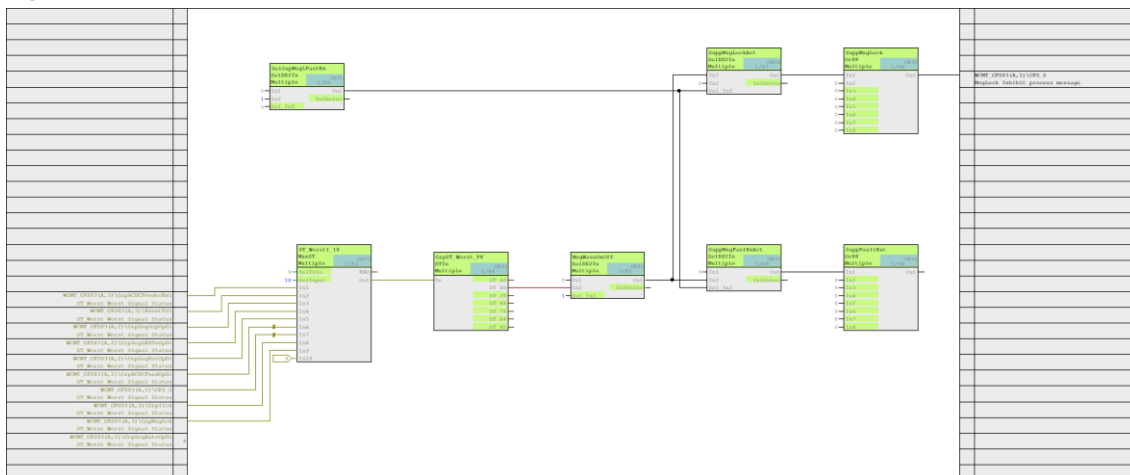


These indicator lights are conceptually, structurally and functionally the same as the drive and valve functions. Blink frequency and Check lights are pre-parameterized and can be selected as an optional variant.

1.11.9 CFC Chart Partition B/Sheet 3

CFC Chart Partition B/Sheet 3 shows one function for message overload suppression:

Figure 1-30



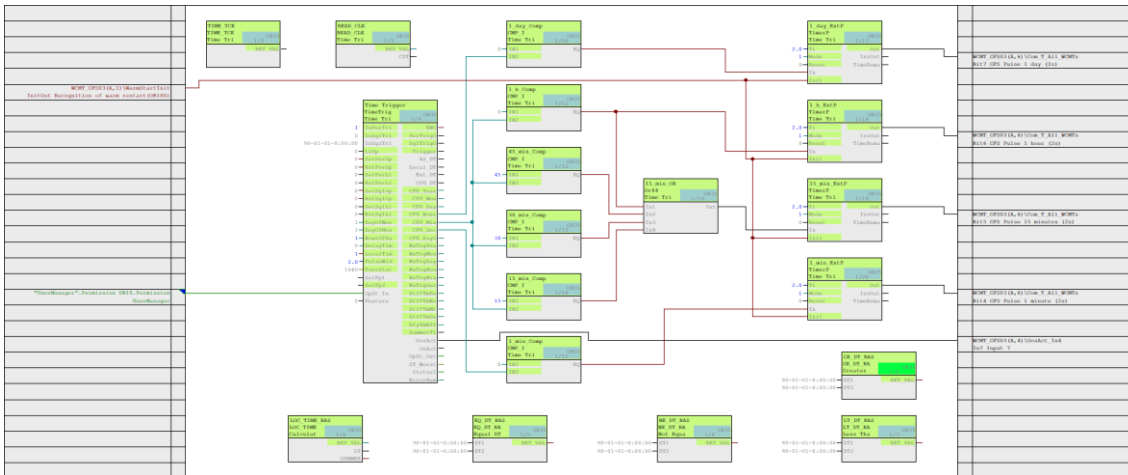
The message overload suppression function can be implemented in two variants. It is possible to select whether it requires acknowledgement or not. The selection is made by parameterizing the "SelID02In" block "SelSupMsgLFautEx". If a 0 is entered at the input tag <Sel_In2>, message overload suppression does not require acknowledgement and can be used directly with a "MsgLock" or with a Reset. If a 1 is entered there, message overload suppression will

require acknowledgement and can be connected down the line to a "FaultExt". This function can be selected as an optional variant.

1.11.10 CFC Chart Partition B/Sheet 4

CFC Chart Partition B/Sheet 4 shows time-related function.

Figure 1-31



The central APL block in this Chart Partition is the "Time Trigger". In addition to clock functions and Date / Time, it also offers other time-related capabilities, all of which can be monitored and controlled via the APL Time Trigger faceplate on the PCS 7 OS.

This Chart Partition also provides extended time pulses each with a duration of 2 seconds as described below:

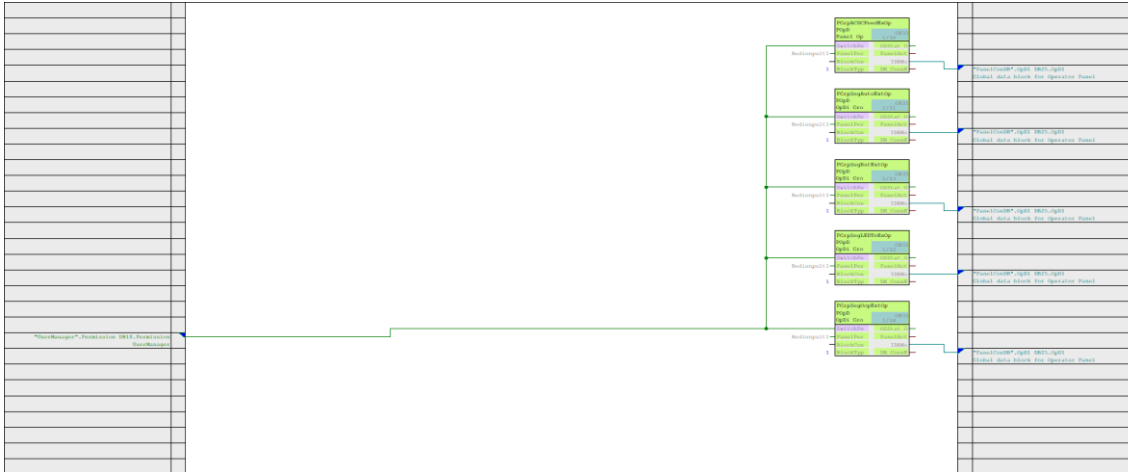
- 1 min time pulse
- 15 min time pulse
- 60 min time pulse
- 24 h time pulse

The "TIME TCK", "READ CLK" and "WarmstartIniXXX" blocks discharge functional tasks in the background. Activation via the technological I/Os is always required. These functions are optionally assigned parameters and are selectable as variants.

1.11.11 CFC Chart Partition B/Sheet 5

CFC Chart Partition B/Sheet 5 shows a function for on-site control and monitoring on a TIA Portal Comfort Panel.

Figure 1-32



With the help of the Panel blocks that go with the "OpDi" OS control blocks from Chart Partitions A1 through A3, the function offers the option of carrying out on-site monitoring and control on a TIA Portal Comfort Panel.

In this way, it is possible to integrate an additional emergency control level with a Comfort Panel independently of a PCS 7 OS station in a water-specific plant. The precise functionality is described in more detail under the umbrella of the "Multiple control room concept" in a separate chapter (see chapter [2.1.2 CFC Chart Partition A/Sheet 2](#)).

This function can be optionally assigned parameters and is selectable a variant.

1.11.12 CFC Chart Partition B/Sheet 6

CFC Chart Partition B/Sheet 6 is a reserved chart.

Note

In case of future expansions, it is recommended not to fill this Chart Partition and leave it empty until further notice.

2 Water-specific control module types

Table 2-1

Chart Partition A	Function blocks
Sheet 1	Plant block with input/output/fieldbus drivers or diagnostic monitoring
Sheet 2	Panel operation with prepared shortcut to the "UsrM" block (WCMT) and local control selection with/without PLC
Sheet 3	Interlock and protection monitoring functions with "PERMIT", "PROTECT", "INTERLOCK" and "EventTS" blocks for operational messages and error messages. Message overload suppression is also implemented with "GrpErr".
Sheet 4	Faceplate for jump distributor, recording of operating cycles/hours and maintenance/diagnostics monitoring
Sheet 5	Drive monitoring (motor protection, control fuse, torque monitoring, chain monitoring, belt monitoring, filter monitoring and/or other special functions) and motor current recording with zero point suppression
Sheet 6	Communication (data cross-traffic, serial couplings, I slave, Package Units, etc.)

Figure 2-2

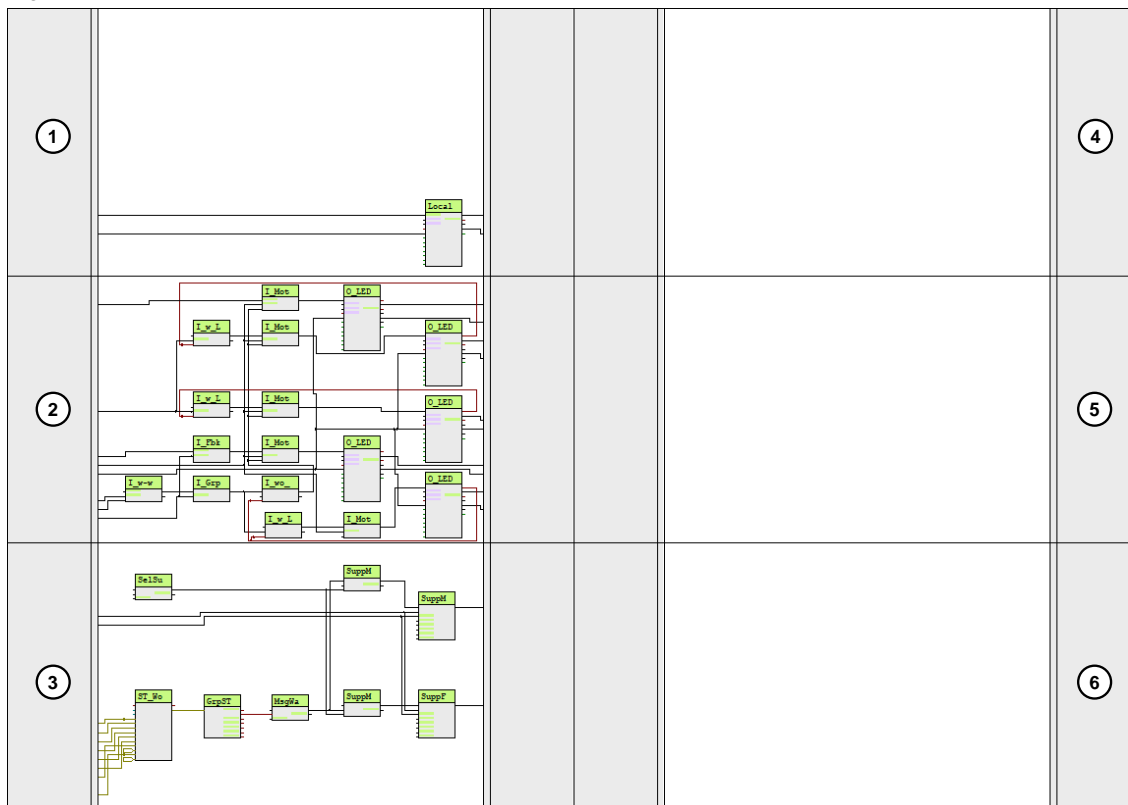


Table 2-2

Chart Partition B	Function blocks
Sheet 1	Advanced functions of a PCS 7 OS faceplate; approval of local control via parameterization "Local Setting 3 and 4" CFC Chart Partition A/Sheet 2
Sheet 2	Advanced functions of on-site messages on the control cabinet using indicator lights
Sheet 3	Advanced functions of message overload suppression, for example in case of failure of a distributed I/O system and/or feeder of the medium-voltage system.
Sheet 4-6	Advanced functions, reserve

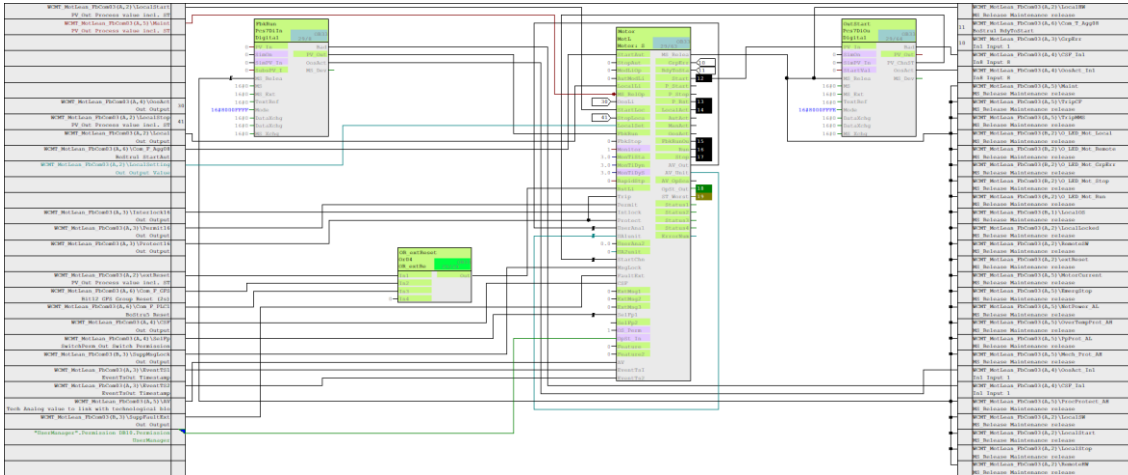
As an example, the following chapters describe four variants of the type WCMT of the PCS 7 Water Templates.

- WCMT_MotLean_FbCom03
 - describes the content and functions with analog/digital input/output drivers
- WCMT_MotLean_FbMMS03
 - describes the contents and functions of SIMOCODE pro V via fieldbus driver connection to PROFIBUS DP
- WCMT_MotSpdC_FbDrv03
 - describes contents and functions of SINAMICS G120 via fieldbus driver connection to PROFIBUS DP
- WCMT_SitrMAG6000_Fb03
 - describes contents and functions of the MA6000 flowmeter via fieldbus driver connection to PROFIBUS DP
- WCMT_SITOP24V_Modular / WCMT_SITOP_PSU8600_1x0/4x0
 - describes contents and functions of 1-/3-phase DC24V power supplies, power supply redundancy, uninterruptible power supply and selectivity with and without fieldbus connection (PROFINET).
- WCMT_PC_...
 - describes contents and functions of low-voltage and medium-voltage power distribution for busbars, circuit breakers, disconnectors, transformers, mains synchronization and measured value monitoring with and without fieldbus connection (PROFIBUS/PROFINET).

2.1 WCMT_MotLean_FbCom03 Template

2.1.1 CFC Chart Partition A/Sheet 1

Figure 2-3



"WCMT_MotLean_FbCom03" provides a drive function with one direction of rotation and one speed in Chart Partition A/Sheet 1. The core technological functions are implemented by the APL block "MotL". In Chart Partition A/Sheet 1 for "MotL", the following signal is connected via the input driver "PCS7DiIn" by default:

- HW: Normally open (Sheet 1) -> <FbkRun> **1/0 = Feedback, drive on/off**

The On/Off control commands from "MotL" are passed to the output module via the output driver "PCS7DiOu/OutStart".

Drive operation is prepared for integration with the multi-user concept (MUC) via the "WCMT_UsrM" solution. It is implemented on Chart Partition A/Sheet 2 of the CFC.

By default, the "WCMT_MotLean_FbCom03" chart template accommodates the following control methods from various operator locations that are common practice in the water industry:

- PCS 7 operation via the faceplate (Automatic, Manual, Out of service)
- Button operation via input module with PLC (local software)
- Button 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 parameter <OosAct_Out =1> of "MotL". The status display in the faceplate gives feedback via the retrospective linking of all associated channel blocks (signals for feedback, motor protection, etc.) to the input tag <OosActLi> of "MotL".

All blocks with the fault message <Bad> are also grouped and interconnected to the I/O <CSF> of the "MotL" motor block.

The <GrpErr> output combines the errors from one block, e.g. MotL. Via the output tag of the INTERLOCK block (2.1.3 CFC Chart Partition A/Sheet 3), this signal is provided by <OR_GrpErr> as a catch-all signal for subsequent processing (interlocks or indicator light display on the control cabinet).

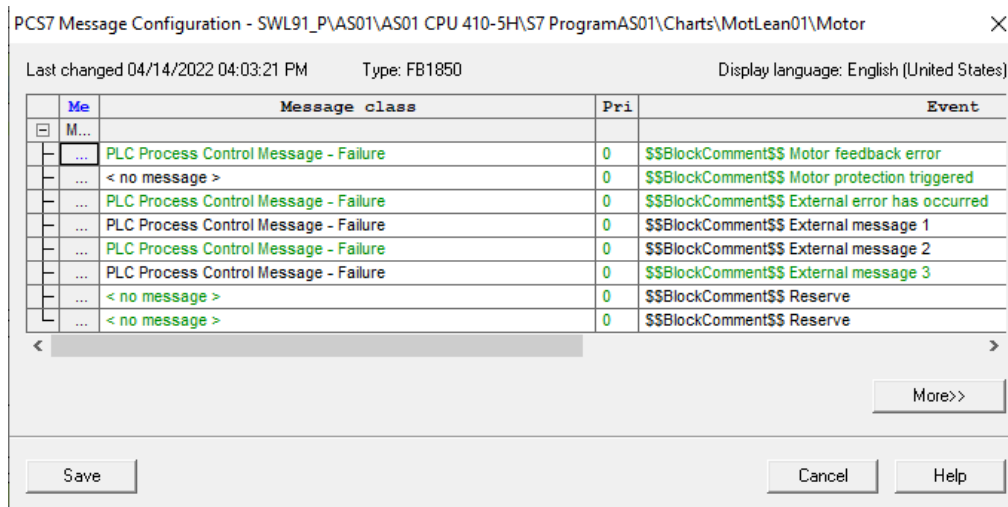
The I/Os <UserAna1> and <UserAna2> are available in the standard view of "MotL" for the interconnection of two analog values, with display as auxiliary value 1 and 2. The <UserAna1> I/O here is interconnected to the motor current by default, while the <UserAna2> I/O serves as a reserve for further project- and task-specific extensions.

Additional information for operating hours and operating cycles is available via the <SelfP1> I/O. The <SelfP2> I/O serves as a reserve for project-specific extensions.

Additionally, "MotL" in "WCMT_MotLean_FbCom03" provides three external messages. These represent the activation of the PCS 7 OS operation "Bypass active" of the INTERLOCK, PERMISSION and/or PROTECT block.

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

Figure 2-4



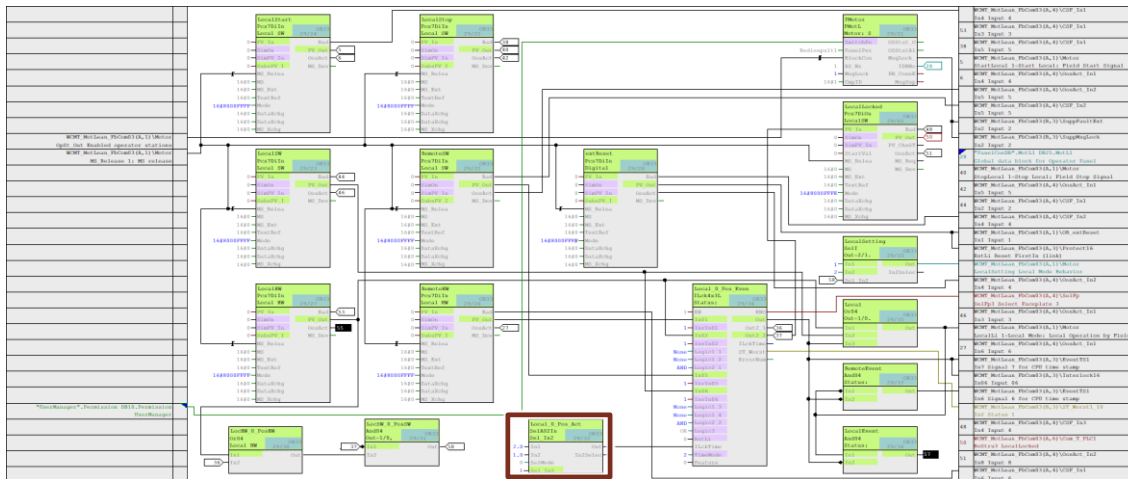
For data archiving, the plant block "MotL" does not have any tags activated for the short- or long-term archive; where applicable, you can make project-specific modifications here.

2.1.2 CFC Chart Partition A/Sheet 2

In Chart Partition A/Sheet 2, "WCMT_MotLean_FbCom03" provides various on-site operator actions. These include the "PMotL" panel block from the Industry Library with data interface to the IPC/Comfort Panel via PROFIBUS DP/PROFINET and the switchable local on-site controls, with and without automation connection for drive control.

2 Water-specific control module types

Figure 2-6 Third-generation local control stations



The cumbersome Boolean logic of the first generation has also been simplified with the new Industry Library block "Ick 4x3".

To speed up engineering for the optionally selectable local control stations, it is recommended to activate the following 8 blocks as a core function of the local control station (in addition to the PCS 7 input driver blocks "LocalHW" and/or "LocalSW"):

- LocalSetting
- LocalSW_0_PosSW
- LocalHW_0_PosHW
- Local
- Local_0_Pos_Act
- LocalEvent
- Local_0_Pos_Event
- RemoteEvent

The new local control station function has been expanded to include the capability of a standardized local control station thanks to Package Unit communication.

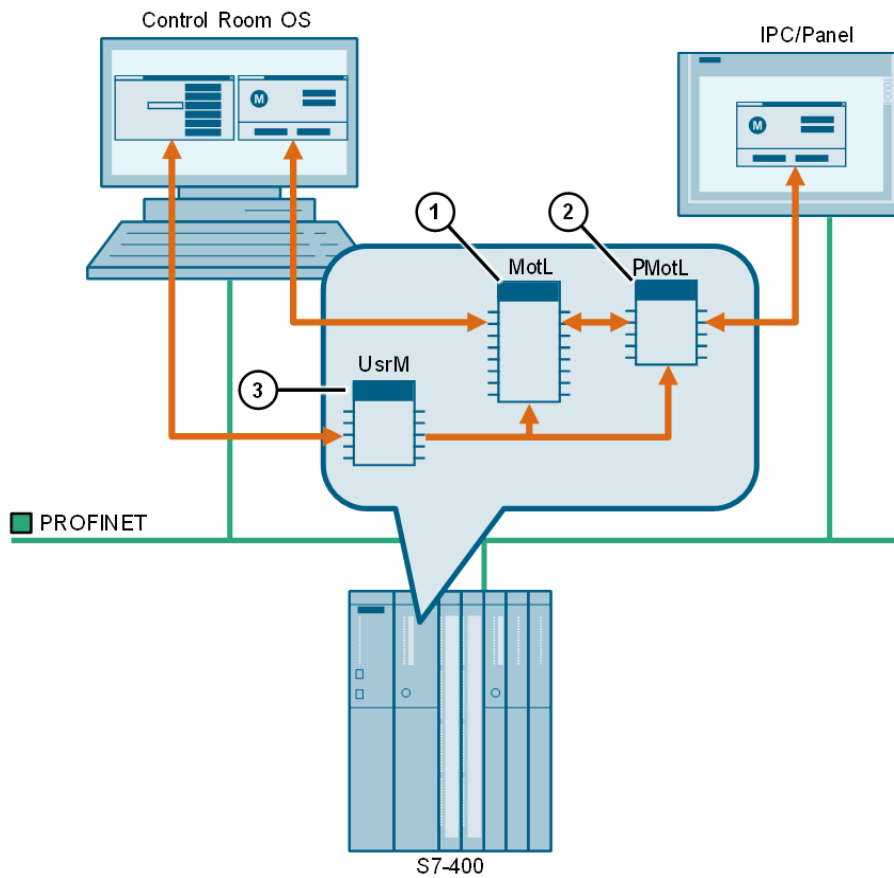
Here, it does not matter which connection method the user chooses (MPI, PROFIBUS, PROFINET, Industrial Ethernet, Modbus). This ensures that a continuous standardized interconnect is established from the Package Unit communication send/receive field up until the respective PCS 7 V9.1 SP2 instance. In two to three connections per instance, Package Unit data are connected via connector blocks with the send/receive range of the respective connection method. For further details, please refer to chapter [1.11.6 CFC Chart Partition A/Sheet 6](#).

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 PCS 7 plant block. If the panel block "PMotL" and the plant block "MotL" are connected to "WCMT_UsrM", the result is the integration of a multi-user concept (MUC) with the PCS 7 OS servers.

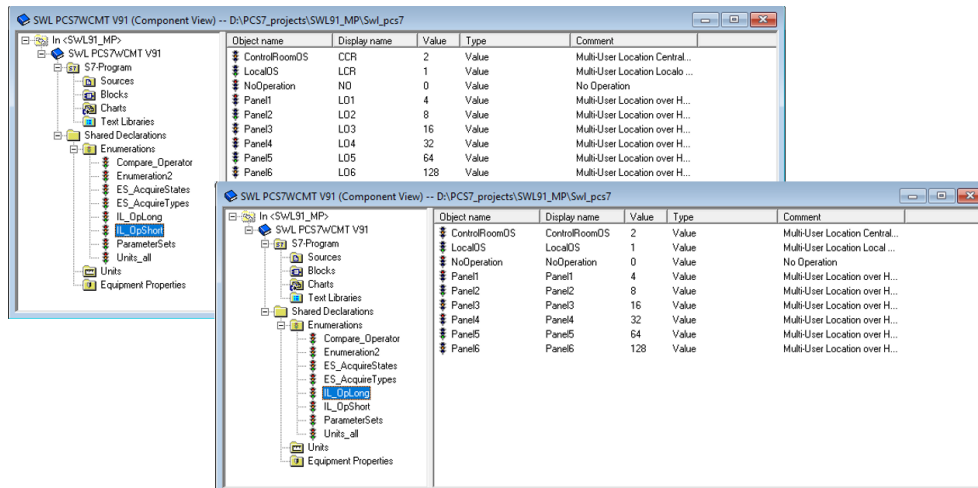
Figure 2-7



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

The multi-user concept can manage up to eight different control locations (OS server and/or Panel). The term "control location" is considered to be a location such as a 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 "WCMT_UstrM". The prepared enumerations can be copied from the Industry Library into the project.

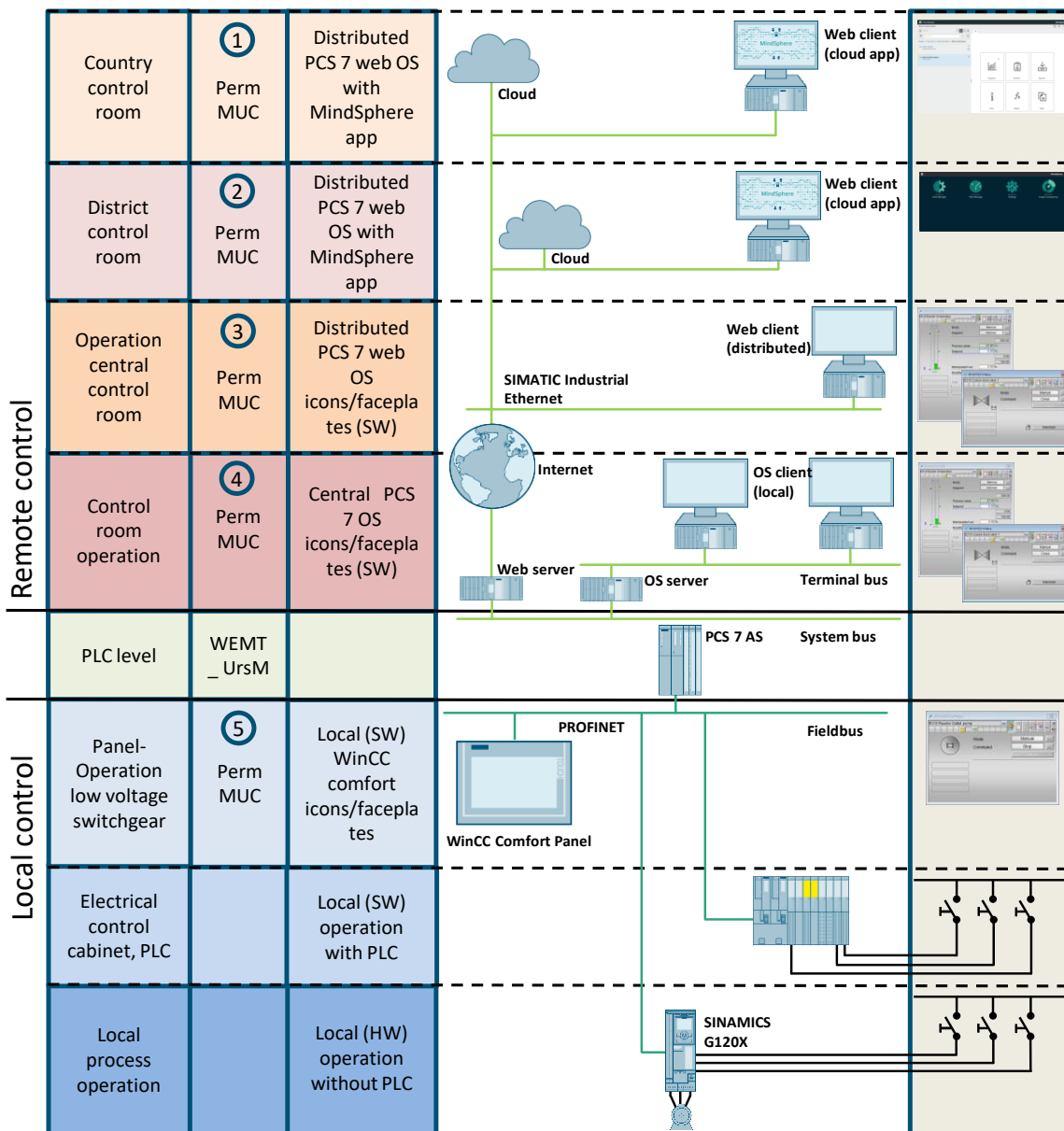
Figure 2-8



2 Water-specific control module types

Each control location receives an additional switching permission number (PERM) on the OS server side, which is stored in the internal tag management of WinCC Explorer. The local operating release is performed by comparing the value of these internal tags "@APLOpStation" with the value at the I/O <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 required communication links between the AS and Comfort Panel/IPC must be assigned parameters in the HW config and Netpro. In addition, the configuration must be engineered with SIMOCODE ES V17 (TIA Portal) depending on the Panel AS type (IPC/Comfort Panel)

Figure 2-9



Perm = PERMISSION MUC = Multi User Concept

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, chapter 2.4 "Multi-station control concept" of the Industry Library for PCS 7
<https://support.industry.siemens.com/cs/ww/en/view/109805917/109278813195>

Besides Panel control, Chart Partition A/Sheet 2 also provides the local control stations with hardware and software connections. Especially in the water industry, both variants may be used together or individually. A typical variant is local on-site operation from the low-voltage switchgear with software control via digital inputs in the automation system.

Upon actuation of the software-level local switch to <LocalSW=1> (see "-S4" key-operated switch), the "LocalSW" signal is forwarded via the input driver "PCS7DiIn" to "Local_0_Pos_Event".

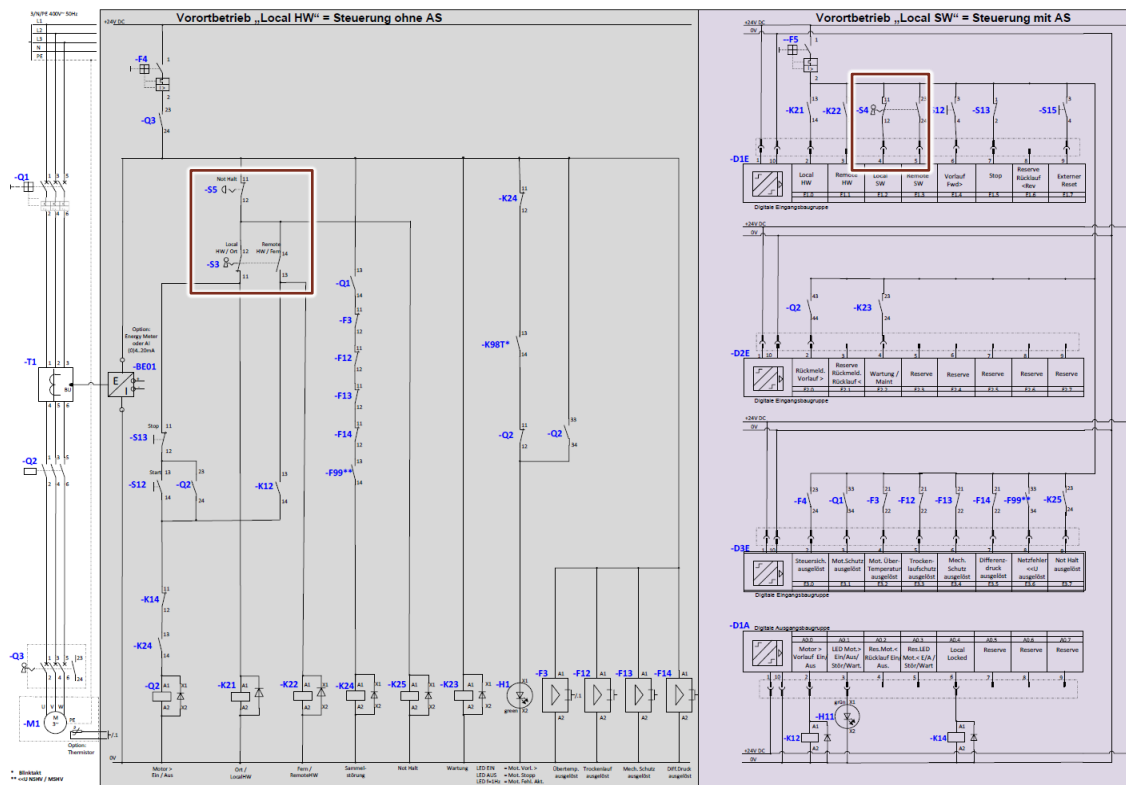
The switchover to <LocalSetting=1> is automatically pre-filled when <LocalSW=1>. The operating mode thereby selected at the "LocalSetting" block is passed directly to the "MotL" input <LocSet>. At the same time, the "Local" block enables permission for external local control at "MotL".

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

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

2 Water-specific control module types

Figure 2-10: Two-point operation



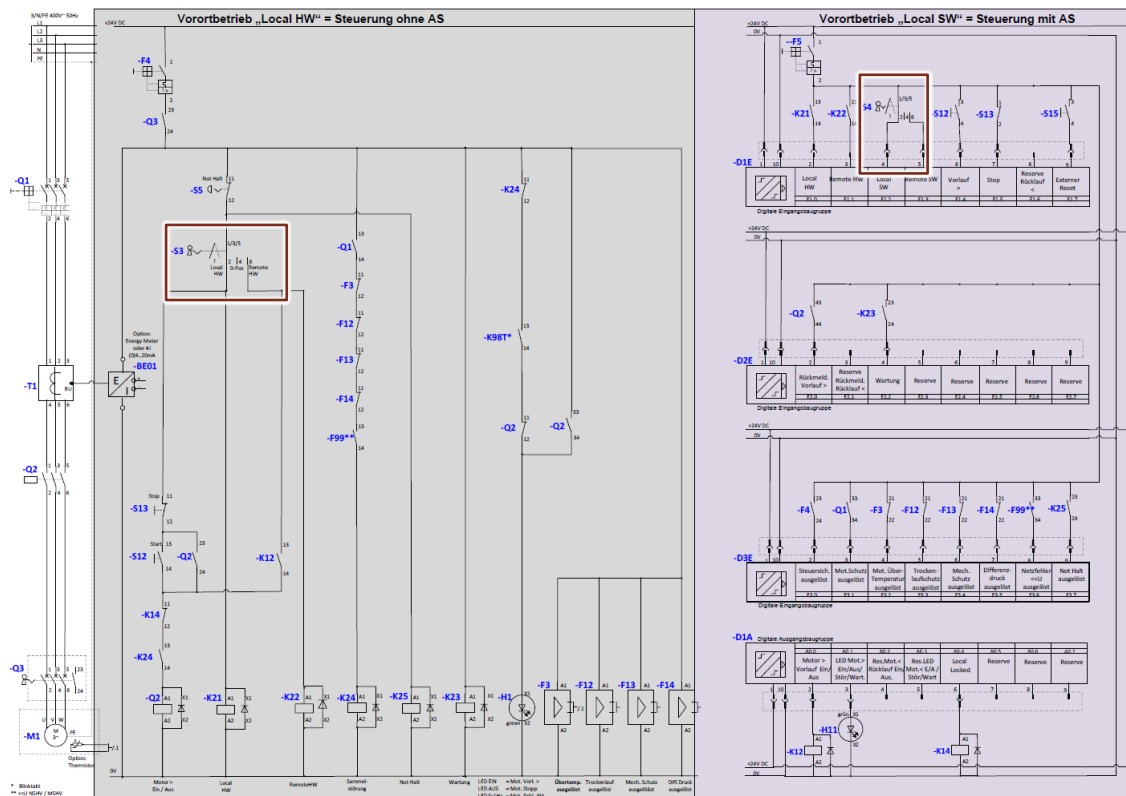
If the local switch (-K22) is set to the input (E1.0) "Ort/Local HW=1", the signal is transmitted via the CFC block "LocalHwSwSwitch". The "LocalSetting = 2" preset with follow-up mode without AS control is thus activated at the "LocalSetting" block. The preselected operating mode "2" is transmitted directly to the "MotL" input <LocSet> by the "LocalSetting" block via the <Out> output.

At the same time, the "LocalEvent" block enables the permission for external on-site control at the "MotL" input <LocalLi> via the <Out> output.

In this mode, the drive feedback <FbkRun> is transmitted via the "PCS7DiIn" driver block in Chart Partition A/Sheet 1 to "MotL" and the errors reported from CFC Chart A/Sheet 3 and 5 are appended.

2 Water-specific control module types

Figure 2-11: Three-point operation



Changing the "Local_0_Pos_Act" parameter of block "IN1" from 0 to 1 in CFC Chart A/Sheet 2 of "WCMT_MotLean_FbCom03" activates the hardware solution shown above.

When activated by a key switch, the local control station accommodates 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") almost always has priority over the software-based control ("LocalSW").

Exception:

Regardless of the local on-site "LocalHW" switch position, the local "LocalSW" on-site control automatically receives the higher permission level when the switch is in the neutral intermediate position ("0" position = drive lock).



WARNING

Important safety warning:

In order for the "LocalSW = 0" drive lock described above to also take effect in the hardware-level control voltage circuit of the drive, the drive must be interlocked via a "PCS7DiOut" digital output (Local Locked = Chart Partition 1) with the relay contact – or, alternatively, with an additional auxiliary relay.

If this is not taken into account, then even when the "LocalSW" drive lock is active, it will still be possible to operate the drive via "LocalSW" with the On/Off pushbuttons in the control voltage circuit.

Figure 2-12

Local / Remote (2-Pos)

Local_0_Pos_ActOut = 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	1
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_ActOut = 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	1	0	1
1	0	0	0	0	1	0	1	0	1
1	0	0	0	1	0	1	0	0	2
1	0	0	1	0	0	1	0	0	2
0	1	0	0	0	1	1	0	0	1
0	1	0	0	1	0	0	0	1	2
0	1	0	1	0	0	1	0	0	1
0	0	1	0	0	1	0	1	0	1
0	0	1	0	1	0	0	1	0	2
0	0	1	1	0	0	0	1	0	1

Switch priority local
HW > Local SW

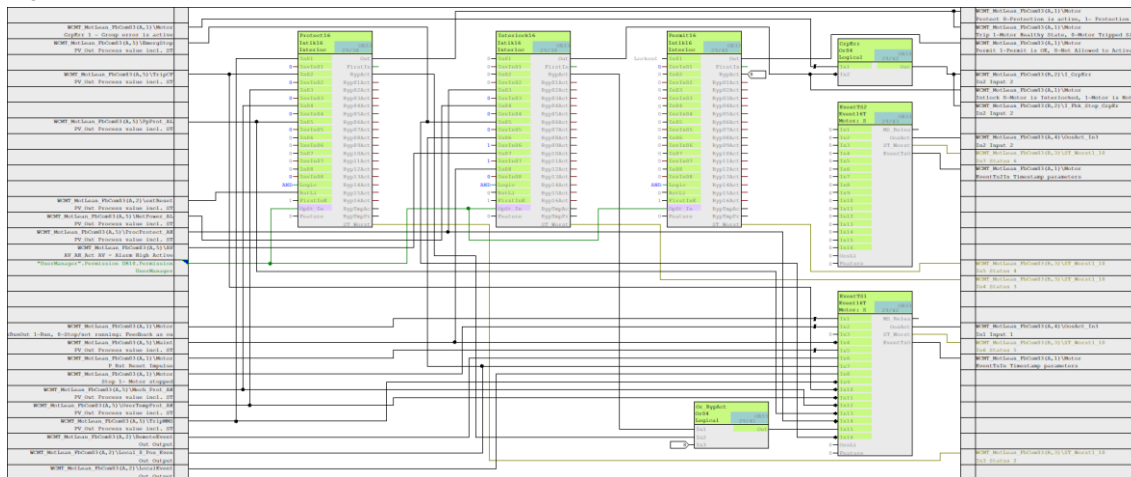
High= 0-Position
Medium= Local
Low= Remote

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 Chart Partition A/Sheet 3

Chart Partition A/Sheet 3 houses the release, protection and interlocks function of "WCMT_MotLean_FbCom03". Three "Interlock16" blocks from the APL provide sufficient protection capacity for the "MotL" drive and are connected with the <Permit>, <Protect> and <Interlock> inputs of "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. The <GrpErr> I/O can also be used to implement message overload suppression.

Figure 2-13



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The newly implemented reporting behavior has been realized with two "EventTS" blocks. The "EventTS" blocks receive the operational messages and error messages from the input drivers for drive monitoring in Sheet 5 ([CFC Chart Partition A/Sheet 5](#)).

The INTERLOCK locking function is conceptually similar to the LOCK I/O type in older PCS 7 versions.

When the interlock conditions are fulfilled, the drive goes into the safety position. If the interlock conditions are no longer met, the drive can be restarted without resetting the interlock. A logical "1" at inputs <IN1> to <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 interconnections at "MotL". If the block is not in the safety position, the ON permission has no effect. The interlock mode "Protect" causes the forced "Switch off" function to occur when an interlock condition is met (<Protect=0>). After restoring the interlocking conditions (<Protect=1>), a reset must be performed in MANUAL mode at "MotL" (see "MotL" Feature Bit 31 = "1"). Resetting is also done with the Status Feature Bit 9 = "0" via the standard view of the "MotL" control 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 will be 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 after the interlock is reset in the "MotL" standard view.

Motor protection

Motor protection ([CFC Chart Partition A/Sheet 5](#)) is interconnected via the "PCS7Diln" input driver "TripMMS" with the <In01> input of "Protect16".

Control fuse

The control fuse in the on-site control without AS ([CFC Chart Partition A/Sheet 5](#)) is interconnected via the "PCS7Diln" input driver "TripCF" with the <In02> input of "Protect16".

Overheating / thermistor protection

The overtemperature/thermistor protection ([CFC Chart Partition A/Sheet 5](#)) is interconnected via the "PCS7Diln" input driver "OverTempProt_AH" with the input <In03> of "Protect16".

Torque / chain / belt monitoring

The torque/chain/belt monitoring ([CFC Chart Partition A/Sheet 5](#)) is interconnected via the "PCS7Diln" input driver "Mech_Prot_AL" with the <In04> input of "Protect16".

Dry-run protection

The dry-run protection ([CFC Chart Partition A/Sheet 5](#)) is interconnected via the "PCS7Diln" input driver "PpProt_AL" with the <In05> input of "Protect16".

Interlock16

All the input signals at the "Interlock16" block are in status "good" when the signal is "1". If one of the input signals falls off ("0"), the drive will be 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 a reset of the interlock in the "MotL" standard view.

Differential pressure / membrane monitoring

The differential pressure/membrane monitoring ([CFC Chart Partition A/Sheet 5](#)) is interconnected via the "PCS7Diln" input driver "ProcProtect_AH" with the <In03> input of "Interlock16".

Mains voltage monitoring

The mains voltage monitoring ([CFC Chart Partition A/Sheet 5](#)) is interconnected via the "PCS7Diln" input driver "NetPower_AL" with the <In04> input of "Interlock16".

Emergency off switch

The emergency off switch (

2 Water-specific control module types

[CFC Chart Partition A/Sheet 5](#)) is interconnected via the "PCS7Diln" input driver "EmergStop" with the <In05> input of "Interlock16".

Local drive lock

The local drive lock (

[CFC Chart Partition A/Sheet 5](#)) is interconnected via the OR block "Local_0_Pos_Event" with the <In06> input of "Interlock16".

Motor overcurrent

The motor overcurrent (

[CFC Chart Partition A/Sheet 5](#)) is interconnected via the "AV" block with the <UserAna1> input of the "MotL" motor block. When the motor starts, the motor current and limit value monitoring are enabled with a delay, as otherwise the current being at 8 to 10 times the rated current would cause an immediate shutdown due to overcurrent.

Permit16

The "Permit16" block is available for project- and task-specific enable signal interlocks and can be optionally interconnected and added.

NOTICE

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

NOTE

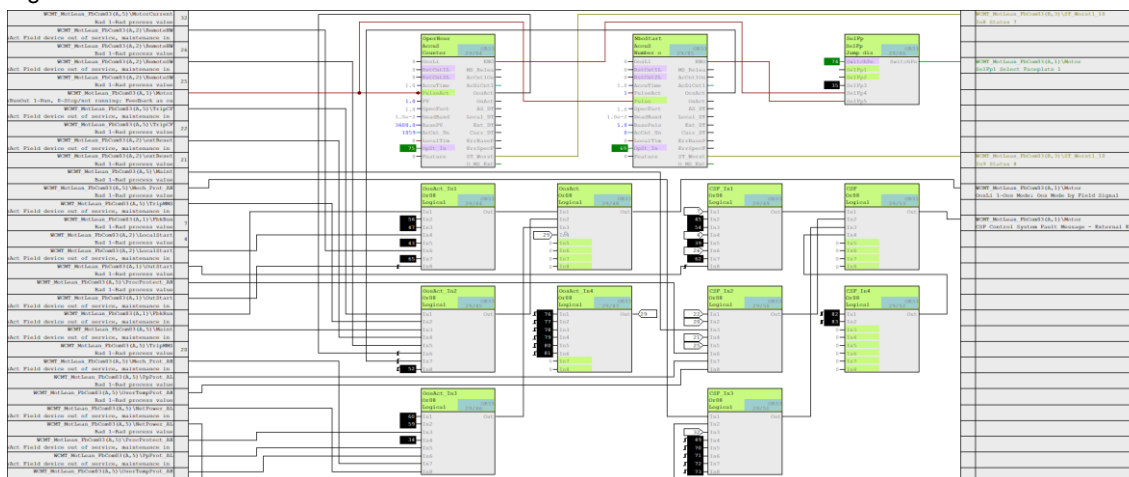
Further information can be found in chapter 8 "Interlock blocks" of the function manual Process control system PCS 7 Advanced Process Library:

<https://support.industry.siemens.com/cs/ww/en/view/109812806/73974323339>

2.1.4 CFC Chart Partition A/Sheet 4

Chart Partition A/Sheet 4 of "WCMT_MotLean_FbCom03" provides a faceplate jump distributor, a block for counting operating hours and a block for counting operating cycles.

Figure 2-14



2 Water-specific control module types

The output <SwitchPe> of the "SelFp" block (jump distributor) is interconnected with the input <SelFp1> on the "MotL" block. The "SelFp" block originates from the Industry Library and, in addition to the operating hours and number of start processes, provides the user with three additional selection options (drive functions and/or additional measurements) on "MotL". The user can access the faceplate "SelFp" from the "MotL" standard view with the "Additional functions" button.

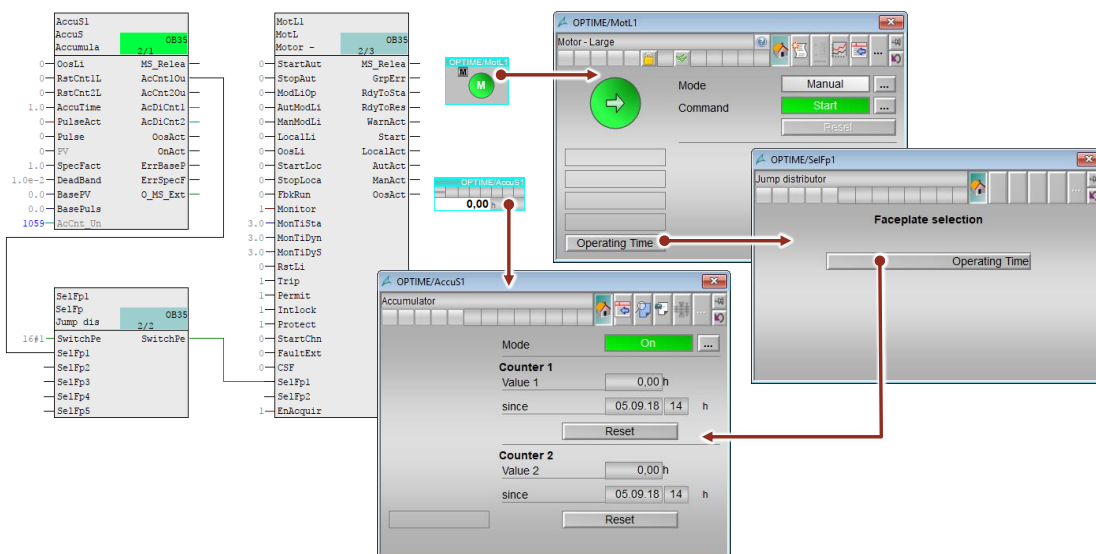
A benefit of this variant is the functional grouping of process technology-related components (e.g. pressure, flow, level and temperature measurements) and energy components (e.g. active energy, active power, apparent power, reactive power, cos phi, lead voltage) with equivalent AKS identification.

In addition, a block icon is eliminated for each function. This makes the process displays 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 <SelFp1> and <SelFp2> I/Os at the parameter "OS Additional Text". The same approach also applies to text changes in the "SelFp" block. Text changes can only take effect and be displayed after the entire project has been compiled in "MotL" or the "SelFp" faceplate.

Figure 2-15



The AccuS (OperHour) operating hours counter from the APL records the operating time of "MotL" in two time intervals, e.g.:

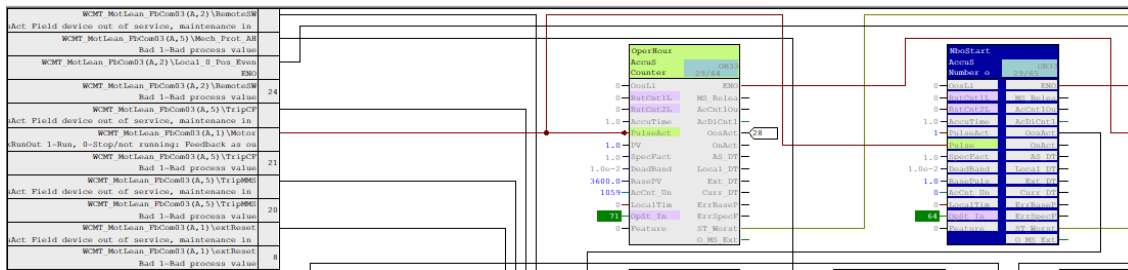
- A day counter (use within the last 24 hours)
- Long-term counter (use since start of first use)

Via the button "Operating hours" of the preview view of "MotL", the user can access the parameters for control and monitoring of the operating hours.

The operating cycles counter has been implemented with the "AccuS" (NboStart) block. It detects every position change of the motors and valves.

2 Water-specific control module types

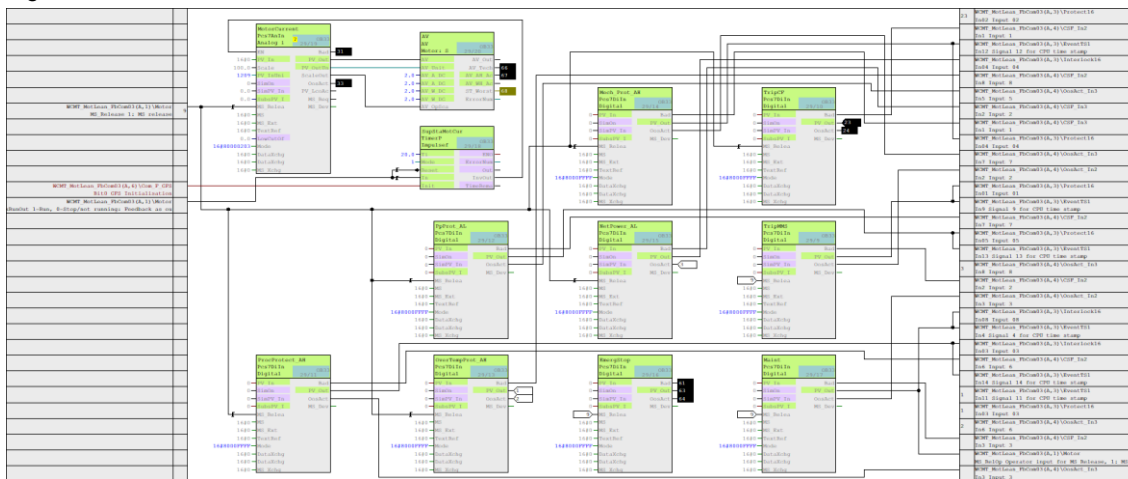
Figure 2-16



2.1.5 CFC Chart Partition A/Sheet 5

Chart Partition A/Sheet 5 of "WCMT_MotLean_FbCom03" implements drive monitoring functions (motor protection, control fuse, torque monitoring, chain and belt monitoring, filter monitoring and/or other special functions) including motor current recording with zero point suppression.

Figure 2-17



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Zero point suppression

In order to prevent a fluctuating motor current in the switched-off state, the "zero_supression" limiter block generates zero-point suppression.

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 <In1> input of the "SelA02In" block "SelZero", thereby maintaining a stable value of "0". If the motor current reaches at least 1 Ampere (hysteresis), the real value of the motor current is enabled again.

The Wire break monitoring at the driver block is always enabled.

Motor current monitoring

The downstream AV block extends "MotL" standard functions with the limit value view in the faceplate. This gives the operator the ability to use additional monitoring and control states for the motor current directly from the faceplate. The motor overcurrent is reported to the "MotL" block and interlocks the drive via the "Interlock16" INTERLOCK block .

Table 2-3

Contact	Block name	Function
HW: Contact	Maint	1/0 = maintenance switch ON/Maintenance_Service
HW: Contact	TripMMS	1/0 = motor protection ON/triggered
HW: Contact	TripCF	1/0 = Control fuse triggered
HW: Contact	EmergStop	1/0 = Emergency Stop not tripped/Emergency Stop tripped
HW: Contact	NetPower_AL	1/0 = Supply voltage OK/Supply fault in low-/medium-voltage distribution system
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): Motor overcurrent triggered

The signal from the channel driver "Maint" (maintenance/service) is interconnected via OR blocks to the <OosLi> I/O of motor block "MotL" (Sheet 1). In an error-free state the signal delivers a "1" signal. When the repair switch is tripped, the "MotL" block switches off the drive and signals that it is out of operation. Incoming warnings, faults and operating messages are suppressed in this operating mode.

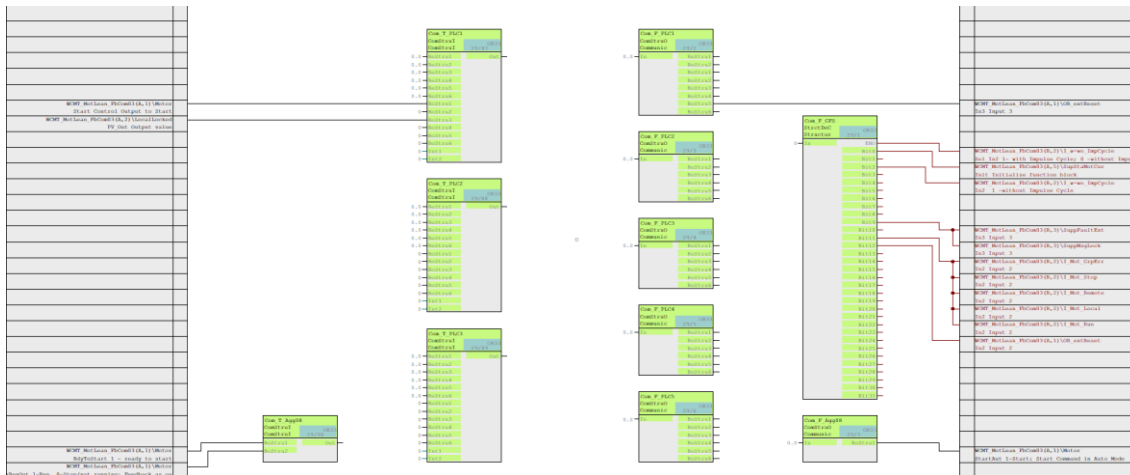
NOTE

It is recommended to measure the motor current after the motor starts.

2.1.6 CFC Chart Partition A/Sheet 6

The PCS 7 Water Templates reserve an area in all Chart Partitions A, Sheet 6 for future communications extensions. The design of this Chart Partition prepares it for local data cross-traffic, serial couplings, telecontrol technology, MindSphere, OPC UA communication in conjunction with SIMATIC Cloud Connect CC712 / CC 716, Aggr08, Global Function Services (GFS) or Package Units.

Figure 2-18



In PCS 7 Water Templates with the "_FbCom03" designation, the Control Module is extended by one additional standardized local control station via a Package Unit communication.

With the help of the connector blocks "ComStruIn" and "ComStruOut", all signals from the Control Module relevant for communication are grouped in a structure, or they are disassembled back into individual tags. The structures can then be interconnected via the <Out> output or the <In> input with the send/receive field of the communication method, for example Modbus/TCP.

PCS 7 version V9.1 adds two more structure block links to this chart:

- from/to equipment block 08
- from Global Function Service (GFS)

The structure block Aggr08 from and to the equipment block contains only one connection per direction. It obviates the numerous individual logic ops between the drive/valve block.

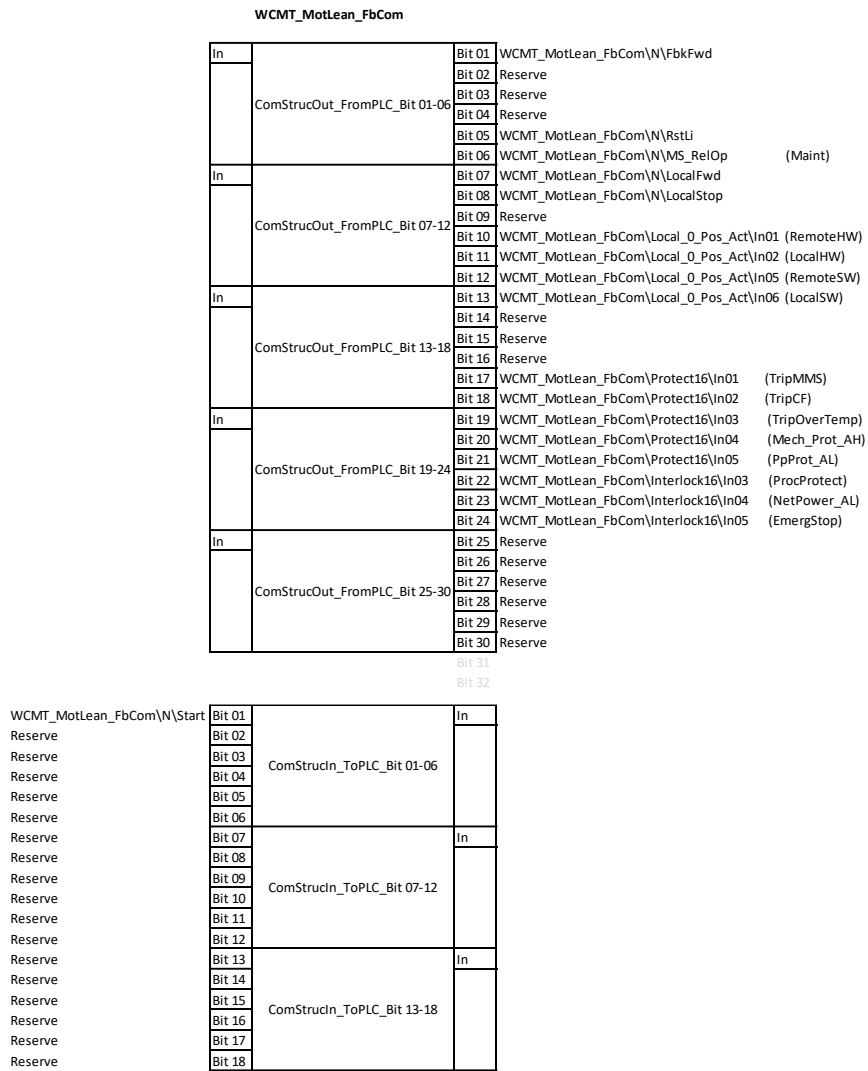
Via a structure connection, the Global Function Service block "Com_F_GFS" provides additional centralized information from the CPU and Unit/plant to every connected, parameterized WCMT.

Since this interface mostly explains itself with tooltip texts, the details can be found in the enclosed WCMT_GFS03 profile, or they can be looked up in chapter [1.11.6 CFC Chart Partition A/Sheet 6](#).

Information on the connection to the Package Unit can be found in chapter: [1.9 Solutions for Package Unit connection](#).

2 Water-specific control module types

Figure 2-19 Communication interface with the Package Unit

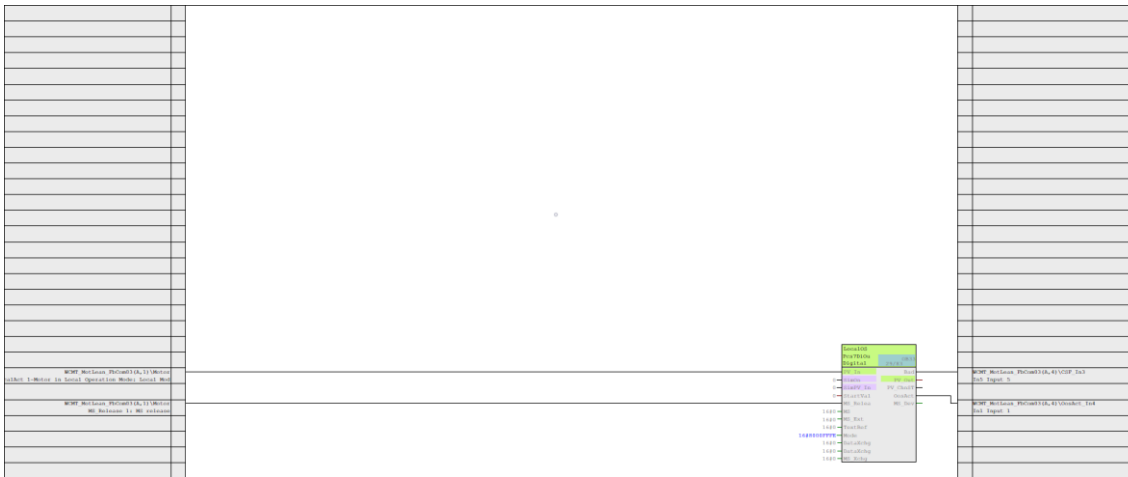


2.1.7 CFC Chart Partition B/Sheet 1

In the advanced functions on Chart Partition B/Sheet 1, there is the option to move on-site control to faceplate control on the operator level while the process is running. To do this, you must change the input tags <In1> from 1 to 3 and <In2> from 2 to 4 at the "Sell" block "LocalSetting" in CFC Chart Partition A/Sheet 2 in the WCMT master data library.

This reassignment of parameters to the control field causes the "LOCAL" operating mode to become enabled and operable in the OS faceplate of a drive. On-site control, for example with a key-operated switch in the process, is no longer necessary. If the "LOCAL" operating mode is activated in the OS faceplate, a "1" signal will be present at the <LocalAct> block output of the drive block. This signal is passed on to the I/Os for subsequent use in a hardware-based local control level in Chart Partition B/Sheet 1 via a "Pcs7DiOut" driver block. If the "LOCAL" operating mode is deactivated in the OS faceplate, a "0" signal will be present at the <LocalAct> block output of a drive block and the on-site control level will be disabled.

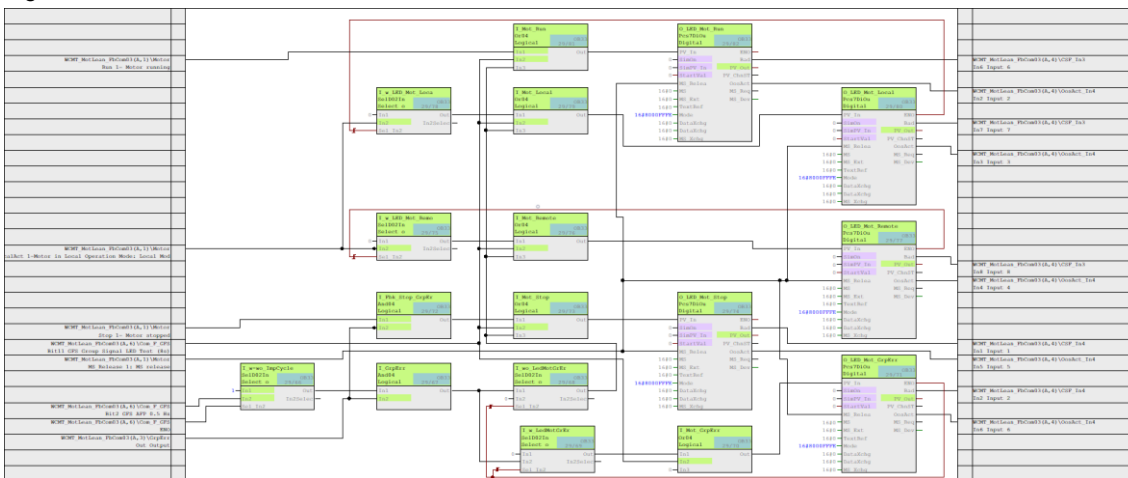
Figure 2-20



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2.1.8 CFC Chart Partition B/Sheet 2

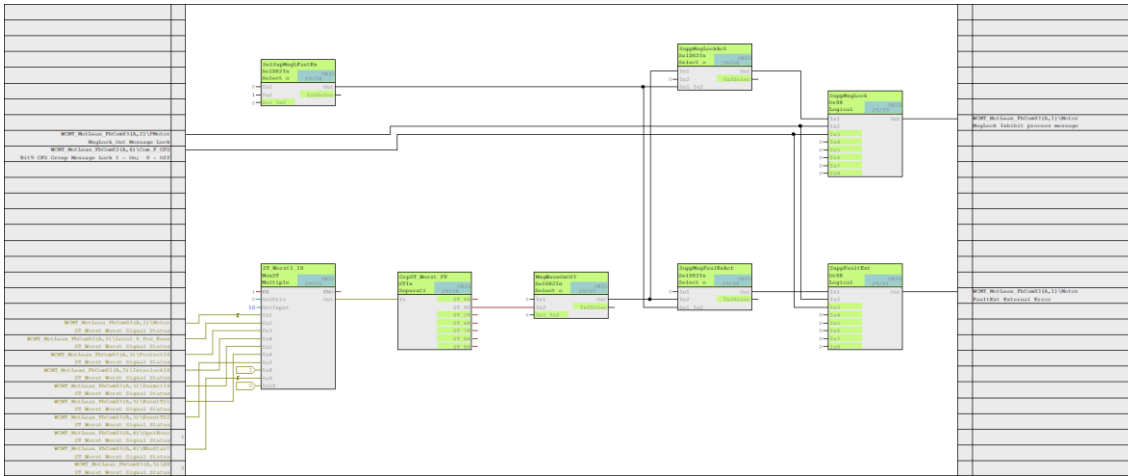
Figure 2-21



The configuration matches that of "WCMT_GFS03", Chart Partition B/Sheet 2. Further information can be found in chapter: [1.11.8 CFC Chart Partition B/Sheet 2](#).

2.1.9 CFC Chart Partition B/Sheet 3

Figure 2-22



The configuration matches that of "WCMT_GFS03", Chart Partition B/Sheet 3. Further information can be found in chapter: [1.11.9 CFC Chart Partition B/Sheet 3](#).

2.1.10 CFC Chart Partition B/Sheet 4 through 6

CFC Chart Partition B/Sheets 4 through 6 are reserve charts.

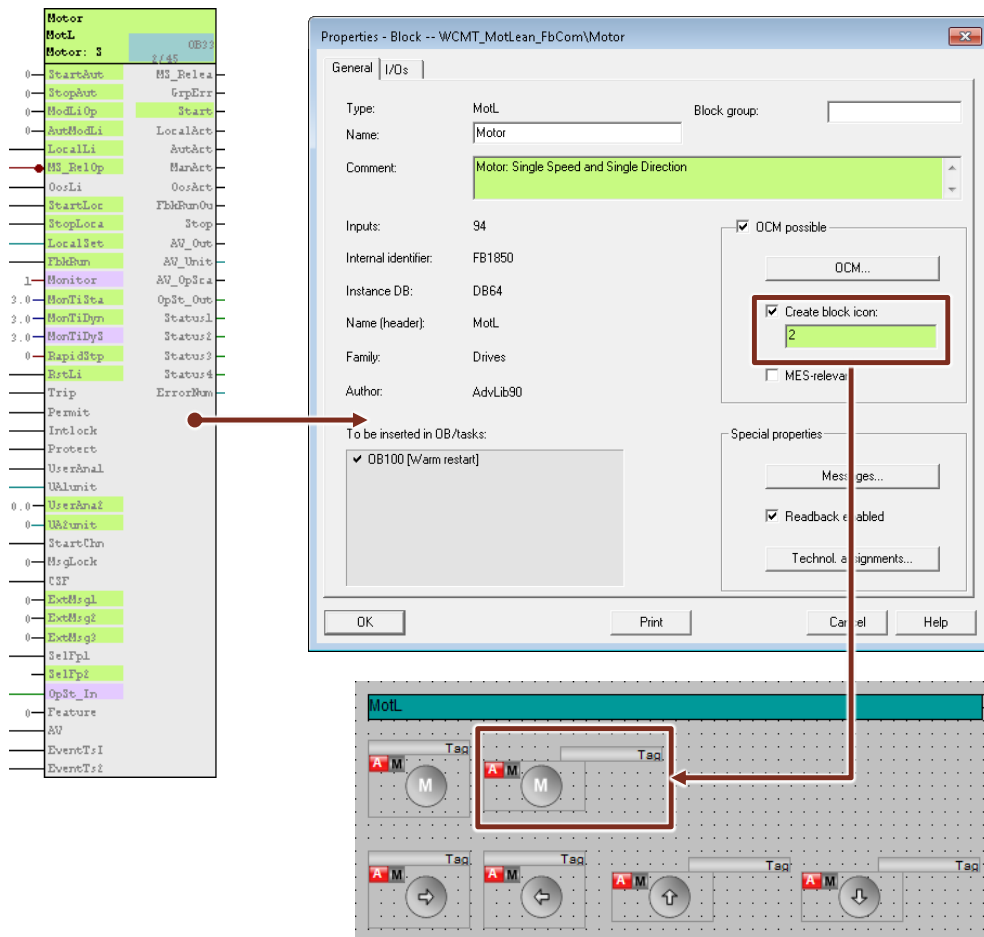
NOTE

In case of future expansions, it is recommended not to fill these Chart Partitions and leave them empty until further notice.

2.1.11 WCMT_MotLean_FbCom03 OS faceplates and icons

Each control module type (WCMT) of the PCS 7 Water Templates receives only one icon 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 to suit the specific task.

Figure 2-23



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The used faceplates and icons of "WCMT_MotLean_FbCom03" are described in the corresponding profile. The profiles are part of this application example and you can obtain them from your regional SIEMENS sales partner.

NOTE

In the chapter entitled [3 WCMT / \(WENT\) profiles](#) you will find the description of a profile along with an example.

Further information on the standard PCS 7 OS faceplates and OS icons can be found in the function manual Process Control System PCS 7 Advanced Process Library:

<https://support.industry.siemens.com/cs/ww/en/view/109812806>

2.1.12 WCMT_MotLean_FbCom03 Panel faceplates/icons

The Panel icons and faceplates form part of the PCS 7 Industry Library, and unlike with the PCS 7 OS, they are not provided automatically for the Control Module Types (WCMTs) of the PCS 7 Water Templates.

With the help of TIA Portal V17, the user separately creates plant-specific screens for Comfort Panel/IPC monitoring & control operations.

The used faceplates and icons of "WCMT_MotLean_FbCom03" are described in the corresponding profile. The profiles are part of this application example; you can obtain them from your regional sales partner.

In the chapter entitled [3 WCMT / \(WEMT\) profiles](#) you will find the description of a profile along with an example.

NOTE

For further information and configuration aids relating to Panel integration, refer to the article: "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 the Industry Library manual for PCS 7:

<https://support.industry.siemens.com/cs/ww/en/view/109805917>.

2.2 WCMT_MotLean_FbMMS03 Template

The "WCMT_MotLean_FbMMS03" example describes the water-specific functions of a SIMOCODE pro V with fieldbus 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 further templates with a signal connection of the same "_FbMMS03" name, and also applies in principle for the fieldbus connection with PROFINET.

The SIMOCODE pro - Communication function manual describes in detail the communications configuration for a SIMOCODE pro V (PN) with PROFINET.

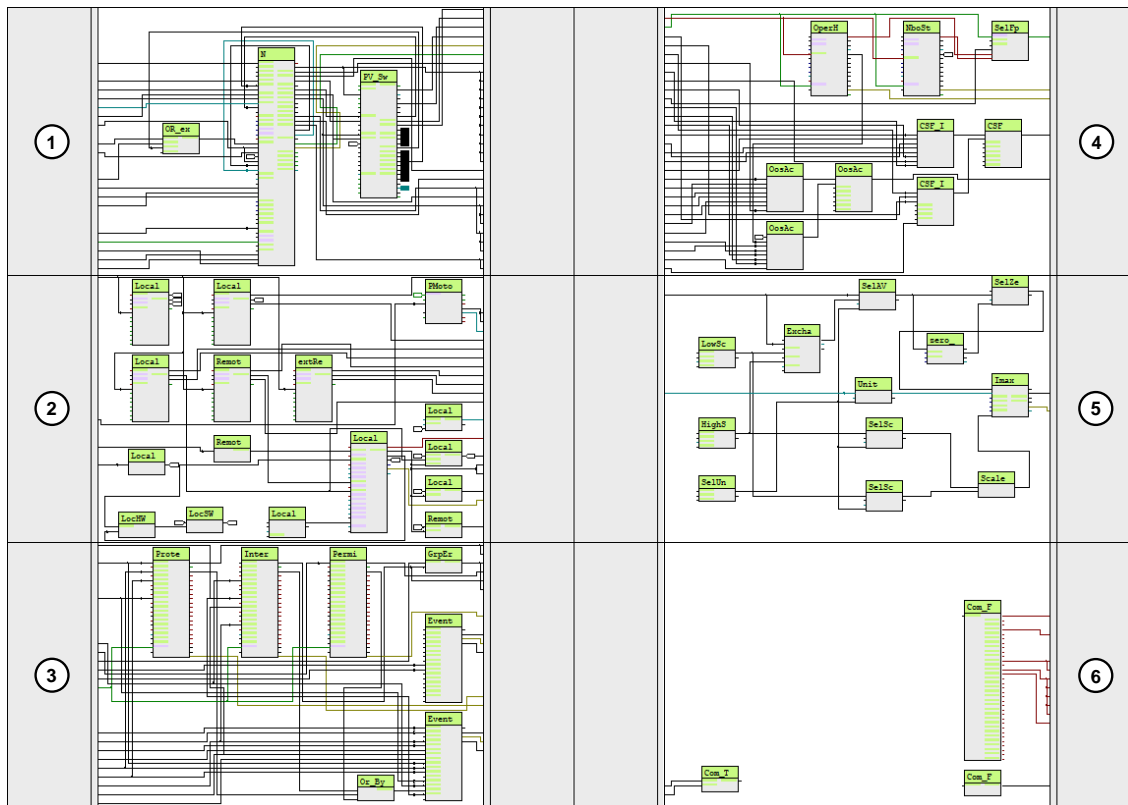
<https://support.industry.siemens.com/cs/ww/en/view/109743960>

This PCS 7 Water Template differs from the previously described "WCMT_MotLean_FbCom03" template only in Chart Partition A/Sheet 1 and Sheet 5. This chapter describes those differences in detail. "WCMT_MotLean_FbMMS03" uses the base type 3 (telegram type) between SIMOCODE pro V PN and the automation system via PROFINET.

Description of base type 3:

In the telegram structure of base type 3, the SIMOCODE Pro V PN contains 20 bytes of input data and 6 bytes of output data. These are used as an interface to the channel block "FbSwtMMS".

Figure 2-24



NOTE

A connection based on PROFIBUS DP will only be prepared upon request.

<https://support.industry.siemens.com/cs/my/src?lc=en-VW>

2 Water-specific control module types

In the hardware configuration, the communication integration of SIMOCODE pro V (PN) should be carried out for PROFIBUS DP and PROFINET with GSD(L).

For SIMOCODE pro V PN with PROFINET, only base type 3 is used in the Water Templates. With 20 bytes of input data and 6 bytes of output data, the maximum cyclical data exchange is utilized. In the first 4 bytes of input data and 2 bytes of output data, base types 2 and 3 are identical. Starting from byte 5 until byte 19, base type 3 provides the following information, supplemental to the "FbSwtMMS" channel block, via peripheral addressing:

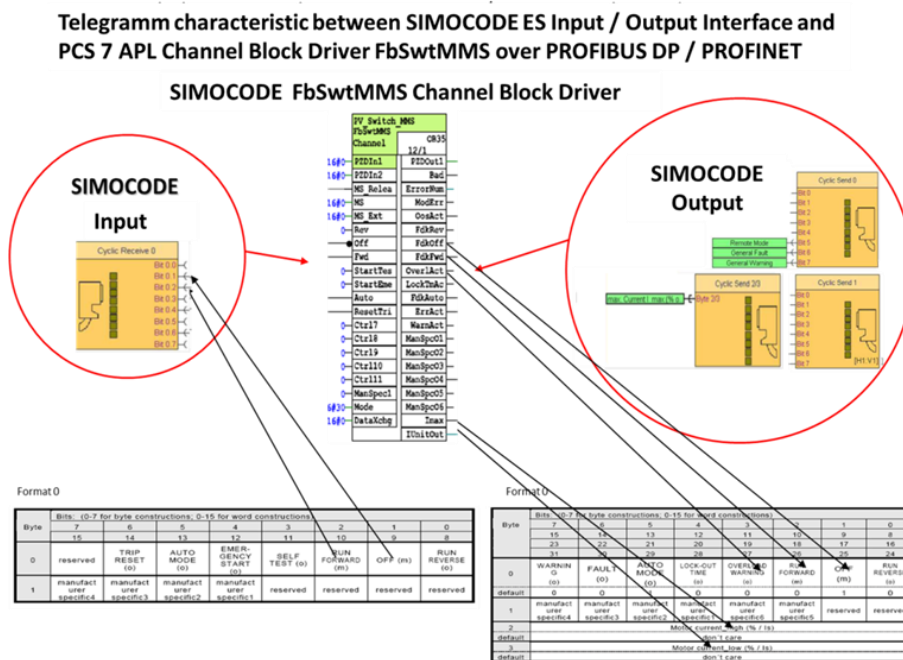
- Motor temperature in [°C]
- cos phi
- Active power in [W]
- Apparent power in [VA]
- Active energy in [kWh]

The SIMOCODE measured values provided have been created for the SIMOCODE WCMT as an example and can be modified project-specifically. For instance, you can swap out the active energy parameter for the operating hours parameter.

In addition, you must modify the included SIMOCODE device parameters and the WCMT.

The following Figure gives a **schematic** description of the input/output interfaces of SIMOCODE pro V ES and the channel block "FbSwtMMS". SIMOCODE pro V contains the telegram structure of the "base type 2" with 4 bytes of input and 2 bytes of output data.

Figure 2-25



A detailed description of the interface for the standard block "FbSwtMMS" can be found in chapter 15.7 of the PCS 7 Advanced Process Library (APL) manual:

<https://support.industry.siemens.com/cs/ww/en/view/109812806/155316766731>

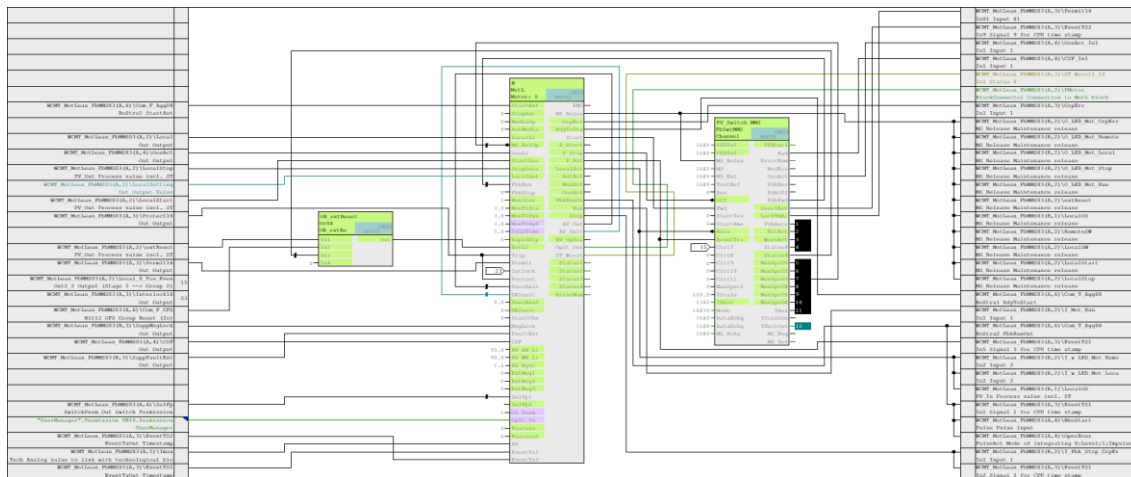
NOTE

For further information about the coupling with PROFIBUS DP, refer to the manual "Function Manual SIMOCODE pro - Communication", chapter 2, "Communication":

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

2.2.1 CFC Chart Partition A/Sheet 1

Figure 2-26



In Chart Partition A/Sheet 1, "WCMT_MotLean_FbMMS03" provides a SIMOCODE pro V drive function with one direction of rotation and one speed via the fieldbus driver block "FbSwtMMS" from the APL. Here, the driver block "FbSwtMMS" handles the cyclic data of "MotL" with the SIMOCODE pro V input/output peripherals via Send and Receive telegrams.

The technological core functions of "WCMT_MotLean_FbMMS03" are identical to the template "WCMT_MotLean_FbCom03" except for two details:

1. For the template "WCMT_MotLean_FbCom03", chapter [2.1.1 CFC Chart Partition A/Sheet 1](#), the fieldbus driver block is "FbSwtMMS".
2. The additional provision of motor current (I_{max}) in [%] or [A] from SIMOCODE pro V to the automation system. In "WCMT_MotLean_FbMMS03" Chart Partition A/Sheet 5, this analog value is described in detail as a special function. The conversion from percent to Amperes is carried out using a two-point equation with the Exchange block. The user must parameterize via "LowScale" and "HighScale" each measuring range start and end value and also parameterize the respective Unit via the "SelUnit" block.

2.2.2 CFC Chart Partition A/Sheet 2

The configuration matches that of "WCMT_MotLean_FbCom03". Further information can be found in chapter [2.1.2 CFC Chart Partition A/Sheet 2](#).

Figure 2-27 First-generation local control stations

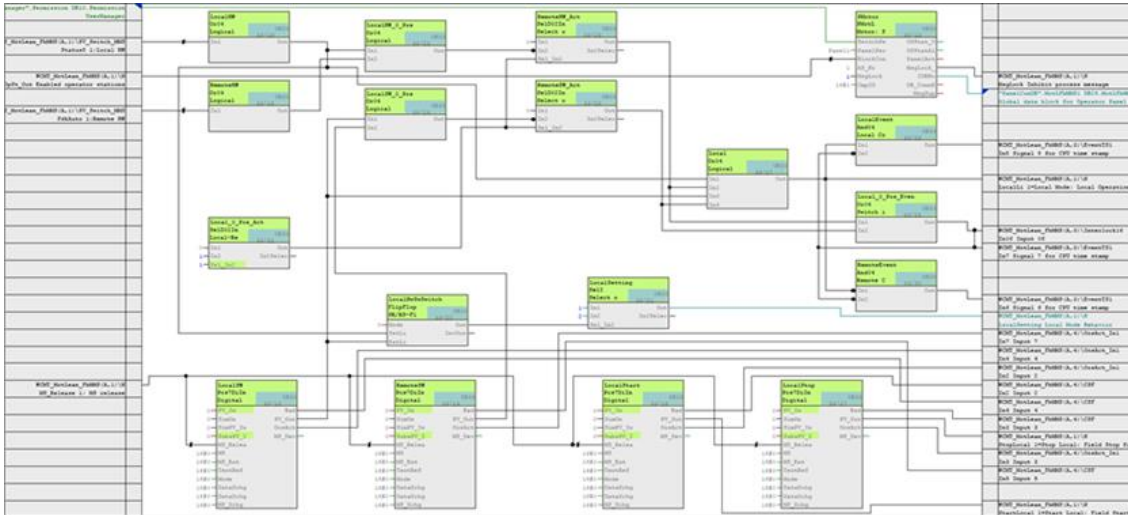
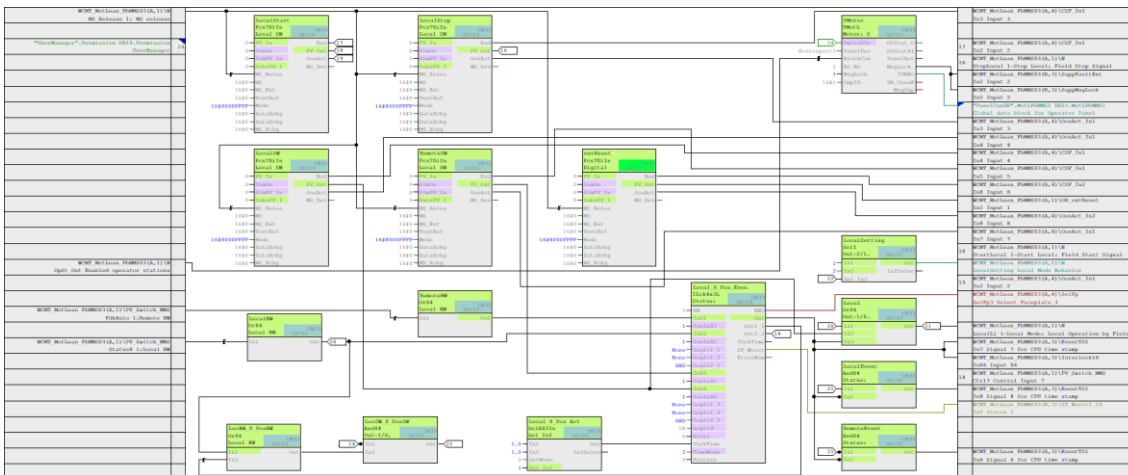


Figure 2-28 Third-generation local control stations



Local on-site control, once activated with a key-operated switch, accommodates a switchover between local control, remote control and a neutral intermediate position (Local – 0 – Remote). With the simultaneous use of both variants of local control ("LocalSW" + "LocalSW"), the hardware-based control ("LocalSW") almost always has priority over the software-based control.

Exception

Regardless of the local on-site "LocalSW" switch position, the local "LocalSW" on-site control automatically receives the higher operator permission level when the switch is in the neutral intermediate position "(0-Pos) = drive lock"

Important safety warning:

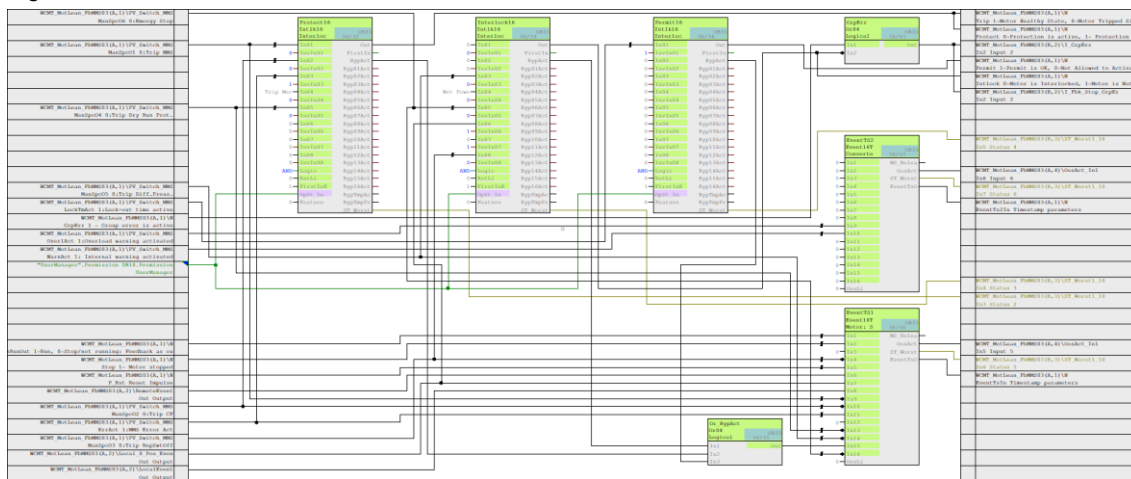


In order for the "LocalSW" = 0-Pos drive lock described above to also take effect in the hardware-level controller voltage circuit of the drive, it must be additionally interlocked via a digital output on the SIMOCODE (Local Locked) by way of a relay contact on the basic unit (BU) – or, alternatively, via an auxiliary relay. See examples on page 60 and 68. If this is not followed, then even when a "LocalSW" drive lock is pending, the drive will be operable via "LocalSW" with the On/Off buttons in the control voltage circuit.

2.2.3 CFC Chart Partition A/Sheet 3

The description is the same as that for "WCMT_MotLean_FbCom03". Further information can be found in chapter [2.1.3 CFC Chart Partition A/Sheet 3](#).

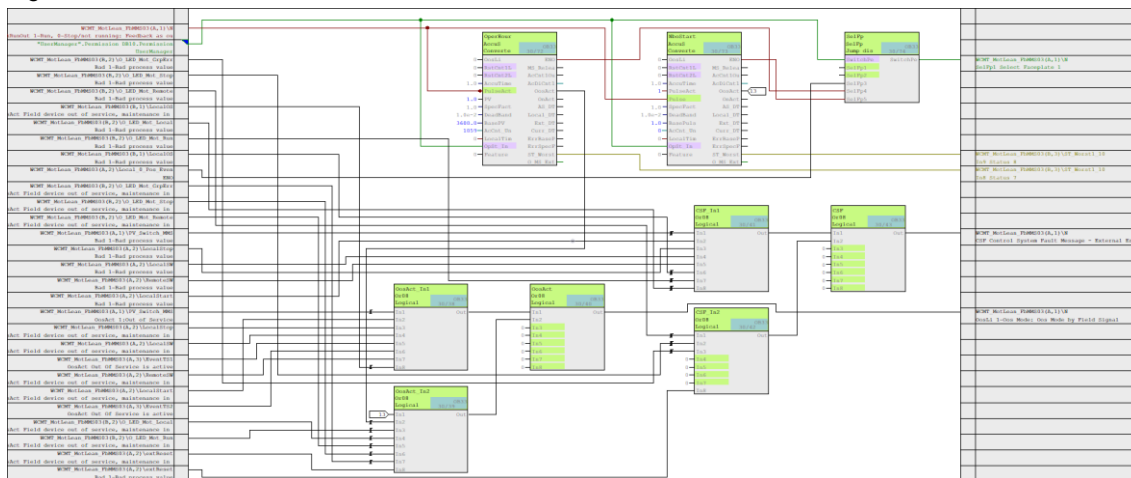
Figure 2-29



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2.2.4 CFC Chart Partition A/Sheet 4

Figure 2-30

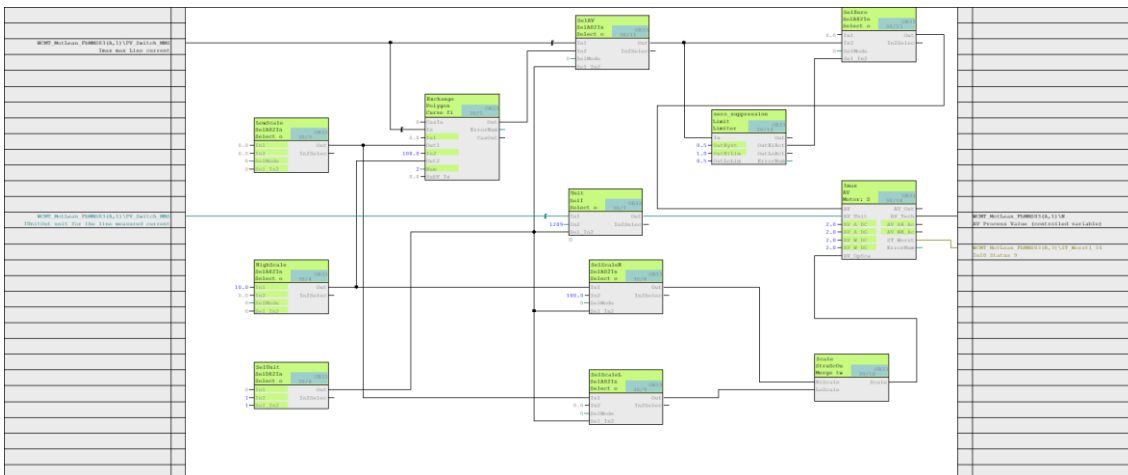


The description is the same as that for "WCMT_MotLean_FbCom03". Further information can be found in chapter [2.1.4 CFC Chart Partition A/Sheet 4](#).

2.2.5 CFC Chart Partition A/Sheet 5

In Chart Partition A/Sheet 5 of "WCMT_MotLean_FbMMS03", the transmitted analog value "Motor current" is provided in the Exchange block either in [%] (SIMOCODE default) or in a scalable measuring range, e.g. 0-10A, via a two-point equation. The two-point equation can be assigned parameters; it must be adapted to any possible measuring range on a project-specific basis.

Figure 2-31



A programmable delay time suppresses an alarm in the event I_{max} is briefly exceeded (chatter suppression). If this time is exceeded and the value is still $> I_{max}$, 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 transducer (4...20mA) falls below the value of < 3.8 mA, 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.

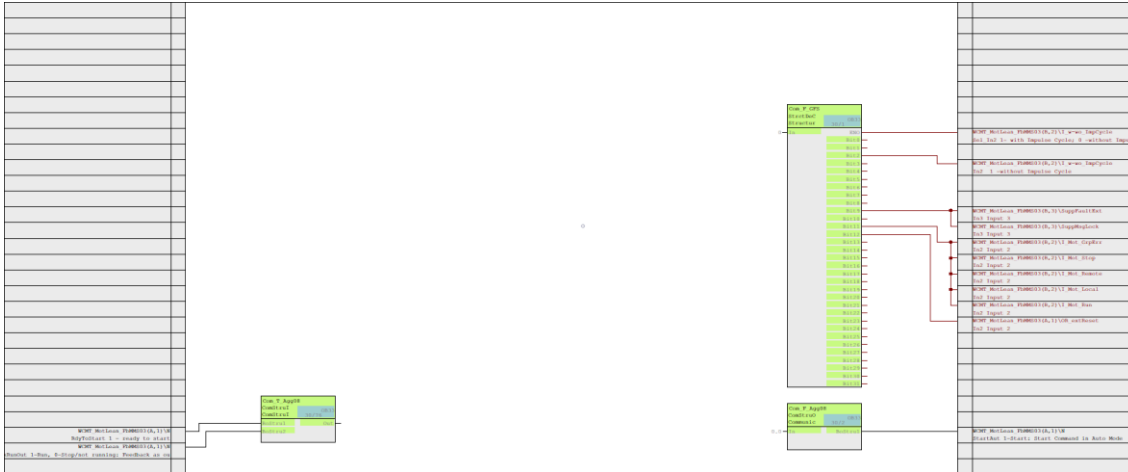
In "WCMT_MotLean_FbMMS03" Chart Partition A/Sheet 1, the motor current (I_{max}) is interconnected with "MotL" via "AV". An additional Limit View is also provided for it in "MotL".

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 motor current (I_{max}).

2.2.6 CFC Chart Partition A/Sheet 6

The description is functionally equivalent to that for "WCMT_MotLean_FbCom03". Further information can be found in chapter [2.1.6 CFC Chart Partition A/Sheet 6](#).

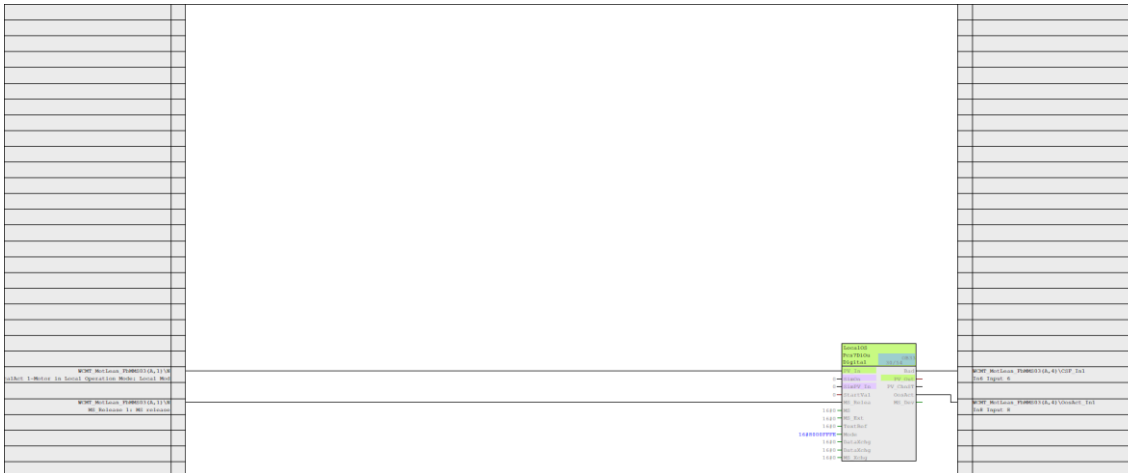
Figure 2-32



2.2.7 CFC Chart Partition B/Sheet 1

The configuration matches that of "WCMT_MotLean_FbCom03" Chart Partition B/Sheet 2. Further information can be found in chapter: [2.1.7 CFC Chart Partition B/Sheet 1](#).

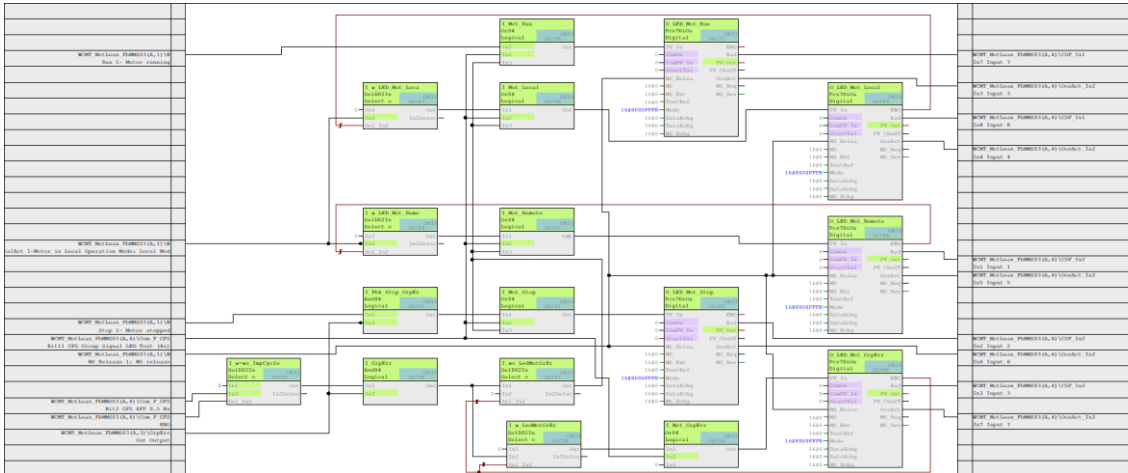
Figure 2-33



2.2.8 CFC Chart Partition B/Sheet 2

The configuration matches that of "WCMT_GFS03", Chart Partition B/Sheet 2. Further information can be found in chapter: [1.11.8 CFC Chart Partition B/Sheet 2](#).

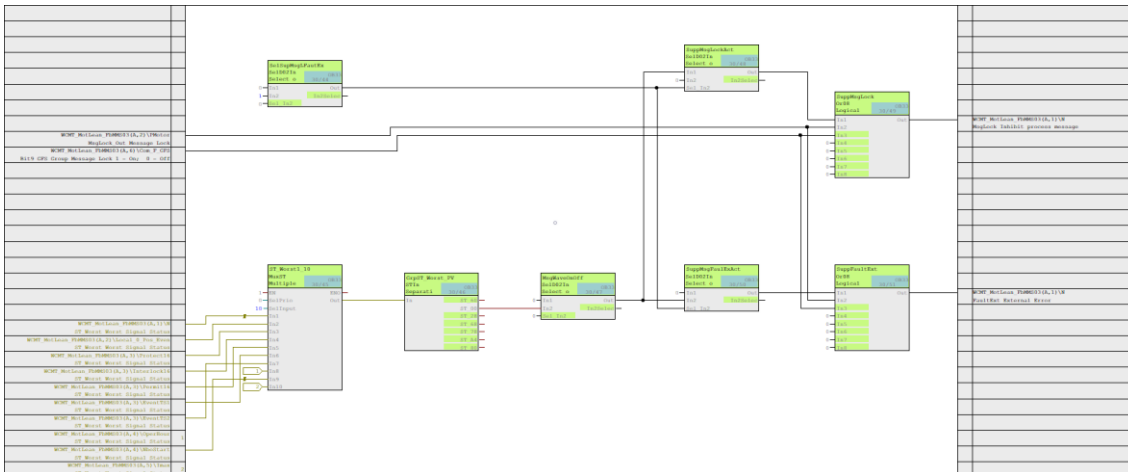
Figure 2-34



2.2.9 CFC Chart Partition B/Sheet 3

The configuration matches that of "WCMT_GFS03", Chart Partition B/Sheet 3. Further information can be found in chapter: [1.11.9 CFC Chart Partition B/Sheet 3](#).

Figure 2-35



2.2.10 CFC Chart Partition B/Sheet 4 through 6

CFC Chart Partition B/Sheets 4 through 6 are reserve charts.

Note In case of future expansions, it is recommended not to fill these Chart Partitions and leave them empty until further notice.

2.2.11 Use of SIMOCODE in connection with Package Units

In connection with a Package Unit, a SIMOCODE drive is always connected to the Package Unit as a fieldbus subscriber (PB or PN).

This communication method always ensures a high availability via the Package Unit CPU, even in emergency mode. If the Package Unit has a data connection with the PCS 7 CPU, each instance has its data handled by the WCMTs with the identifier "_FbCom03" and not by the WCMTs with the identifier "_FbMMS03".

2.2.12 Drive parameter assignment with SIMOCODE ES (TIA Portal)

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

The SIMOCODE is hardware-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 (BU) outputs. The drive status messages are output to the indicator LED via the output of the DM1 digital module.

An extension of the SIMOCODE with a SIMOCODE operator panel and/or OPC is possible at any time. For this, the SIMOCODE device parameterization must also be adapted.

In terms of software, the function block Cycl.Control 0 in the SIMOCODE pro V receives the control commands from the PCS 7 driver block "FbSwtMMS" via the communications connection.

Table 2-4

Input tag FbSwtMMS	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
Crtl7	→	Command Local Locked

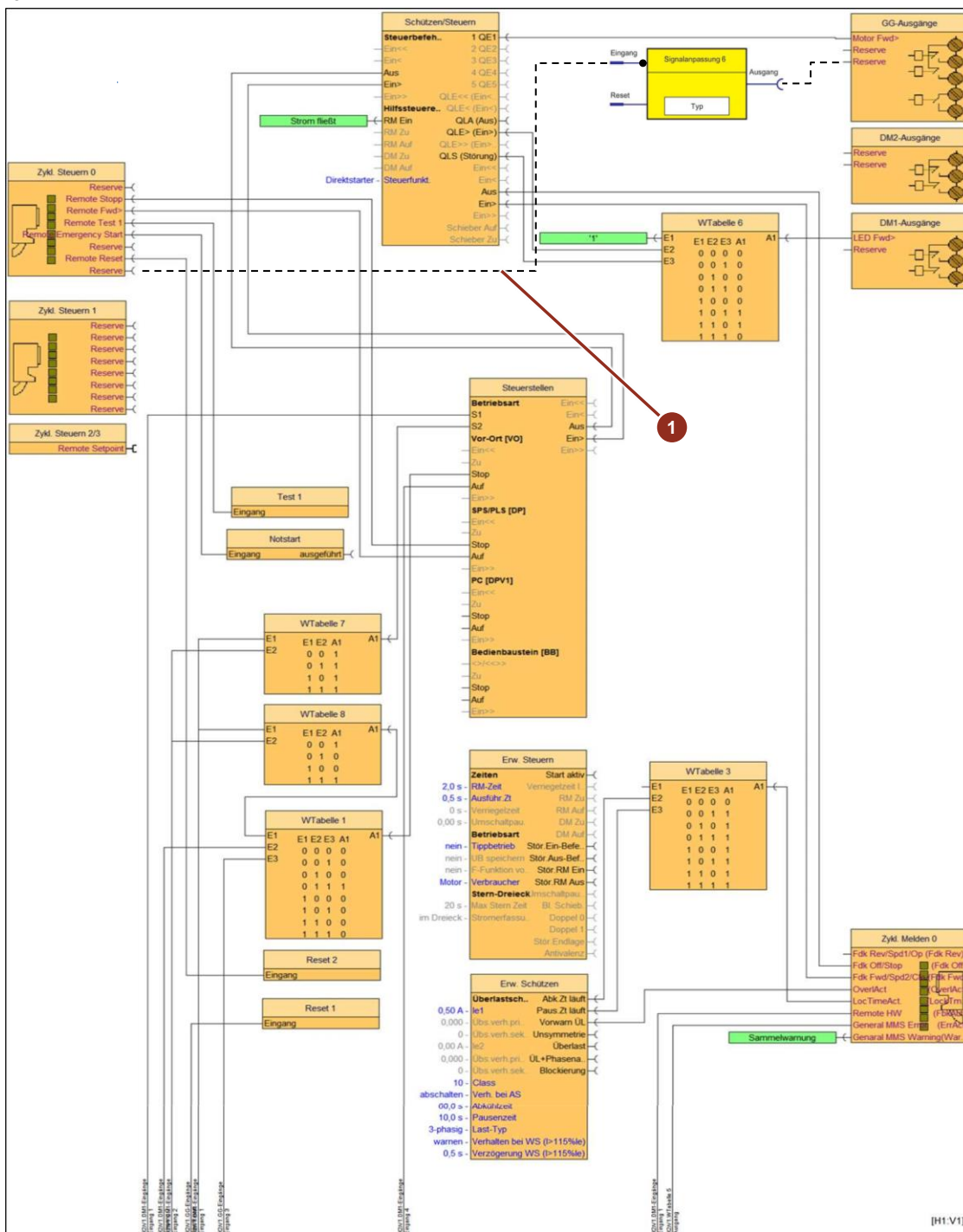
Conversely, the most important drive messages and/or motor current (I_{max}) of the SIMOCODE are sent via the Cycl. Control 0...3 function blocks to the PCS 7 driver block "FbSwtMMS".

NOTE

For additional information, please refer to the SIMOCODE manual collection:
<https://support.industry.siemens.com/cs/ww/en/view/109743951>

2 Water-specific control module types

Figure 2-36 Direct starter PROFIBUS DP



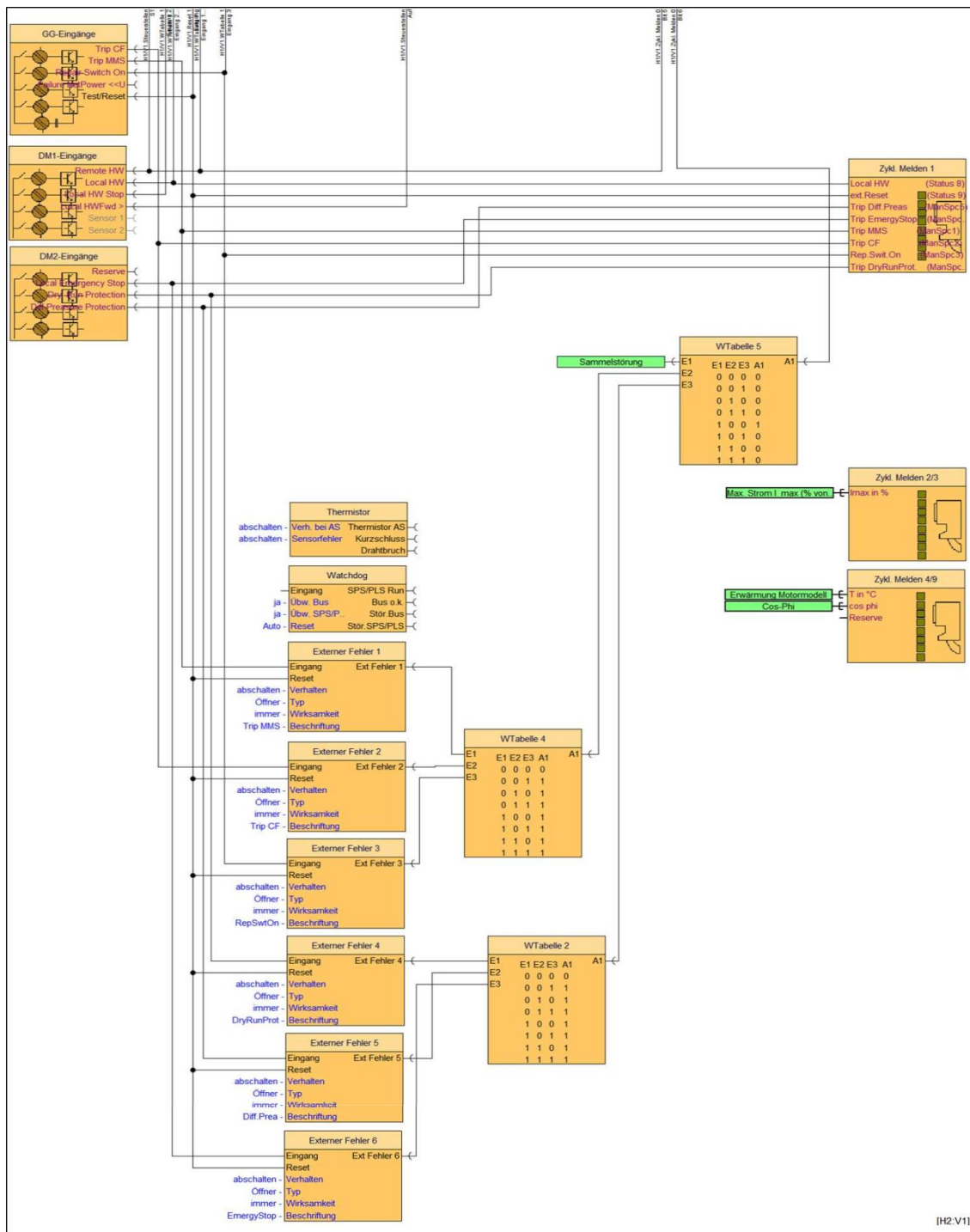
1* Example: Integration of relay contact BU Out3 "Local Locked", only when using "LocalSW-Pos" via PCS 7 control command Ctrl7 = Cycl. Control 0, Bit 7

For more details, see:

[Circuit diagram for SIMOCODE pro V / \(PN\) with PROFIBUS / \(PROFINET\) chapter: 2.2.16.](#)

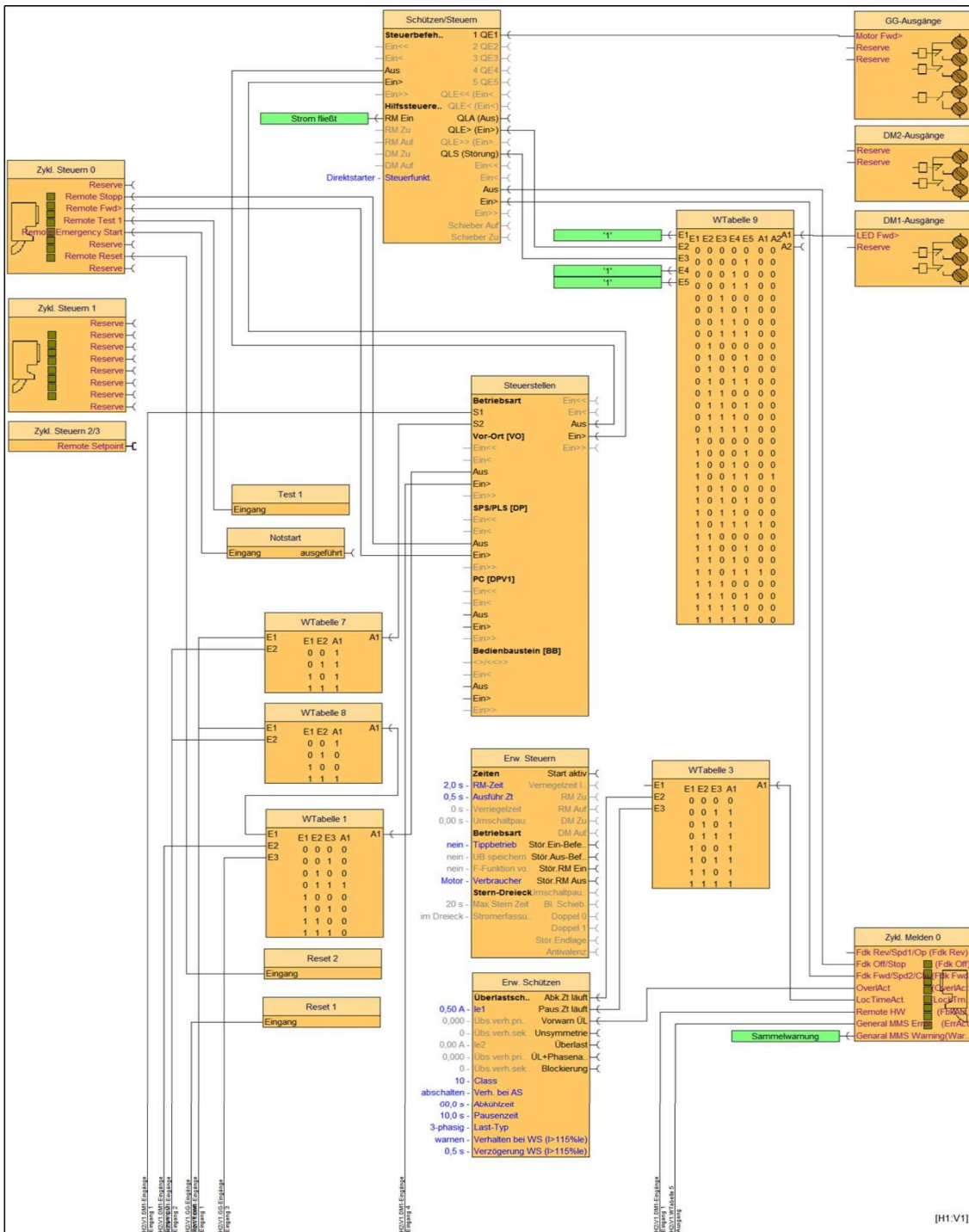
2 Water-specific control module types

Figure 2-37 Direct starter PROFIBUS DP



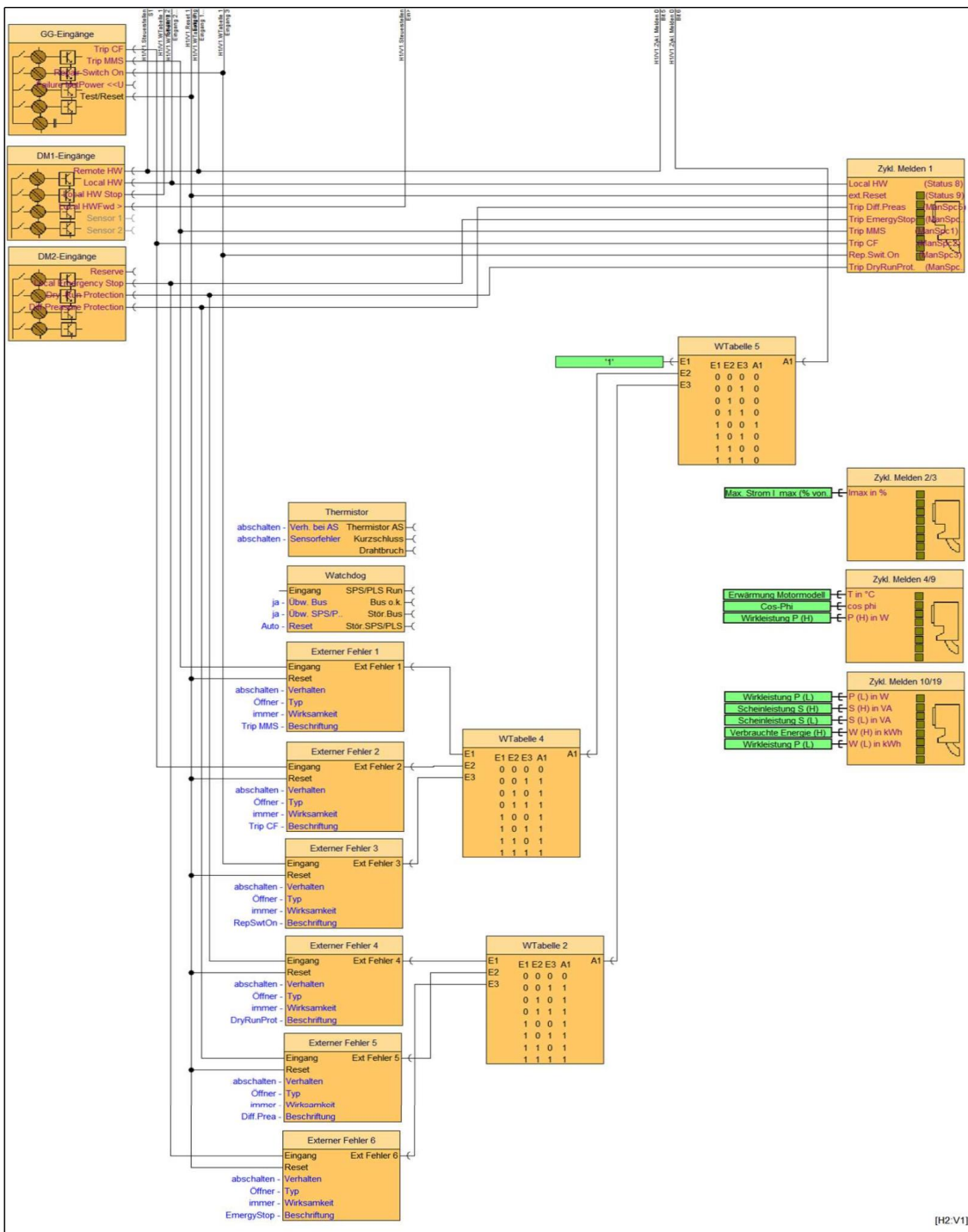
2 Water-specific control module types

Figure 2-38 Direct starter PROFINET



2 Water-specific control module types

Figure 2-39 Direct starter PROFINET



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The local control station (three-point operation) on the SIMOCODE is activated via a switch with normally open contact (location 0 = remote).

The signals are transmitted to the SIMOCODE via the inputs of digital module 1 (DM1) IN1 and IN2. After internal processing downstream in the logic of the SIMOCODE, the signals "RemoteHW" and "LocalSW" are transmitted to PCS 7 via the communication blocks "Cycl. Messaging 0/1". Cyclically updated output appears at the output signals "FbkAuto" and "STATUS8" of the APL interface block "FbSwtMMS".

Table 2-5

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

Table 2-6

SIMOCODE Cycl. Msg 1	Communication	FbSwtMMS output tag
LocalHW	→	Status08
External reset	→	Status09
TripDiff.Preas ³	→	ManSpec05
TripEmergStop	→	ManSpec06
TripMMS	→	ManSpec01
TripCF	→	ManSpec02
TripRepSwtOff	→	ManSpec03
TripDryRun ⁴	→	ManSpec04

Table 2-7

	SIMOCODE internal	
Channel diagnostics PB	↳	OoS_Act
Channel diagnostics PB	↳	ModErr

1. The activation of the maintenance switch on the SIMOCODE is also carried out via a switch with normally open contact (maintenance switch ON/maintenance switch OFF -> Maintenance = 1/0). The signal is transferred to the "BU inputs" software module via the hardware connection IN3 on the SIMOCODE. The output "Maint" of BU inputs is interconnected with SIMOCODE ES and the communication block "Cycl. Messaging 1" connected with input variable "TripRepSwtOff". The standard telegram provides this external signal cyclically at the PCS 7 driver "FbSwtMMS" via the output tag "ManSpec03".

³ For Vlv and VlvMot, replaced by Torque monitoring off

⁴ For Vlv and VlvMot, replaced by Torque monitoring on

2. The integrated RESET button on the SIMOCODE is activated via a normally open contact (RESET On/RESET Off = 1/0). The signal is transferred to the "BU inputs" software module via the internal IN5 I/O on the SIMOCODE. The output "Test/Reset" of "BU inputs" of the SIMOCODE is interconnected via the internal logic with the communication block "Cycl. Messaging 1" with the input tag "ext.Reset". The standard telegram provides this signal cyclically at the PCS 7 APL driver block "FbSwtMMS" via the output tag "Status09".

Optionally, the controls and the associated feedback messages can also be triggered/reported by means of pushbuttons/switches or indicator lights. However, this requires a re-parameterization with SIMOCODE ES V17 (TIA Portal).

The "ON/OFF" connections from the function block "Control stations" to the function block "BB keys" are deleted and interconnected with the I/Os of the function block "BU 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 "BU outputs" or to an additional SIMOCODE output module.

NOTE

SIMOCODE ES V17 (TIA Portal) is available with a trial license in the following article:

<https://support.industry.siemens.com/cs/ww/en/view/109793078>

Configuration 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>

2.2.13 Activation of local/remote switchover with SIMOCODE ES (TIA Portal)

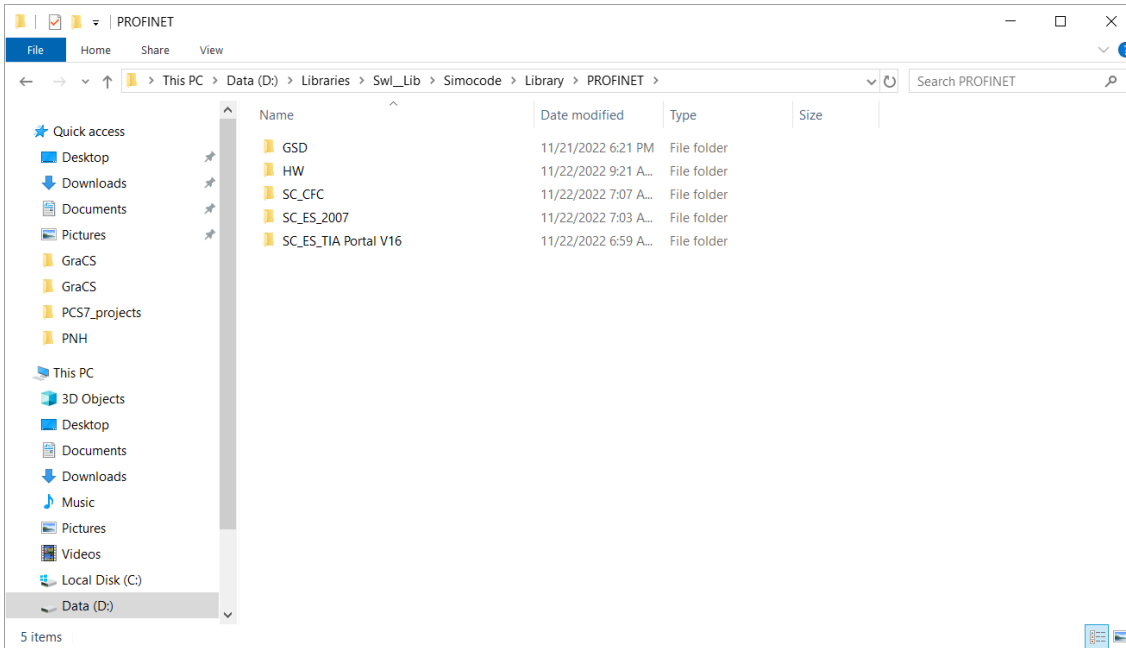
The parameterization of the local control station switchover S1/S2 at control station FB (HW Local/0/ Remote) is carried out via the engineering tool SIMOCODE ES V17 (TIA Portal).

2.2.14 SIMOCODE ES (TIA Portal) drive parameter assignment

The PCS 7 Water Templates also provide suitable drive parameterizations for SIMOCODE ES V17 (TIA Portal) for each template with SIMOCODE Pro V connection.

The project files, hardware plans and GSDML files for SIMOCODE ES are stored in the folders "...\\Swl__Lib\\Simocode\\Library\\PROFIBUS\\" and "...\\Swl__Lib\\Simocode\\Library\\PROFINET\\". The following drives are configured: "MotL", "Mot2Spd", "MotRev", "Vlv" and "VlvMot".

Figure 2-40



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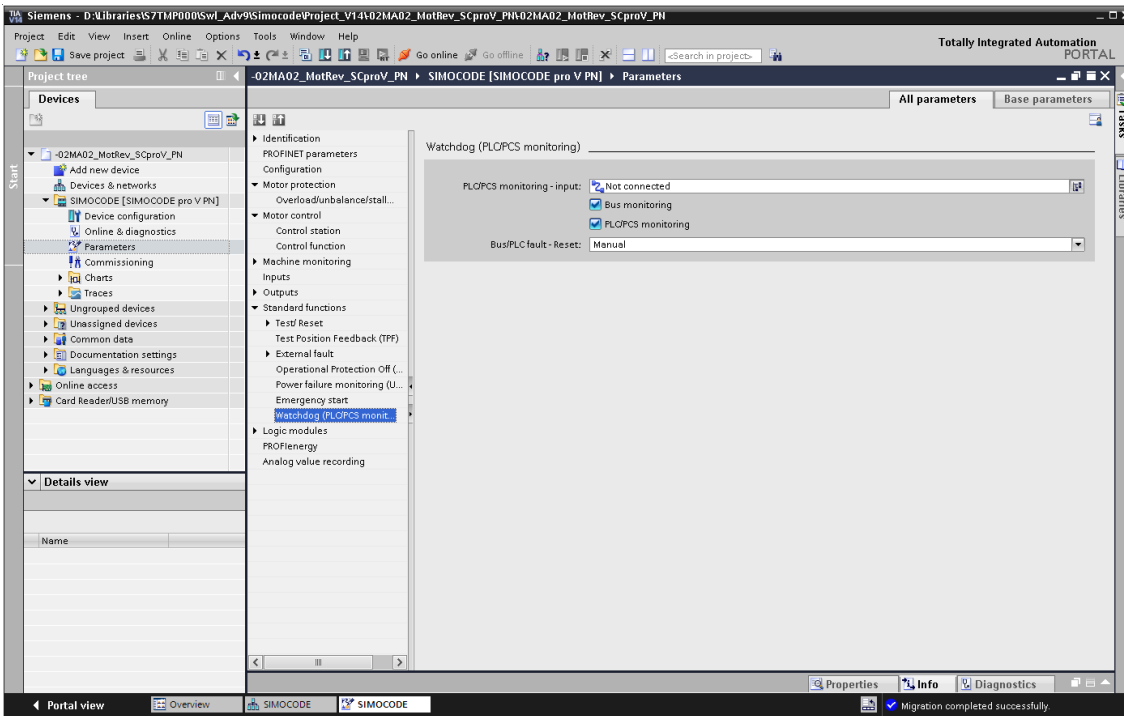
NOTE

Previously configured SIMOCODE projects, e.g. those with SIMOCODE ES 2007 Upd9, can also be converted with system support using SIMOCODE ES V17 (TIA Portal) or higher. Additional details can be found in the following articles:
<https://support.industry.siemens.com/cs/ww/en/view/109753966>
<https://support.industry.siemens.com/cs/ww/en/view/109753874>

2.2.15 Parameterization of bus monitoring with SIMOCODE ES (TIA Portal)

For active communication monitoring between AS and SIMOCODE via PROFIBUS DP, the parameter assignment must be followed as shown in the following Figure.

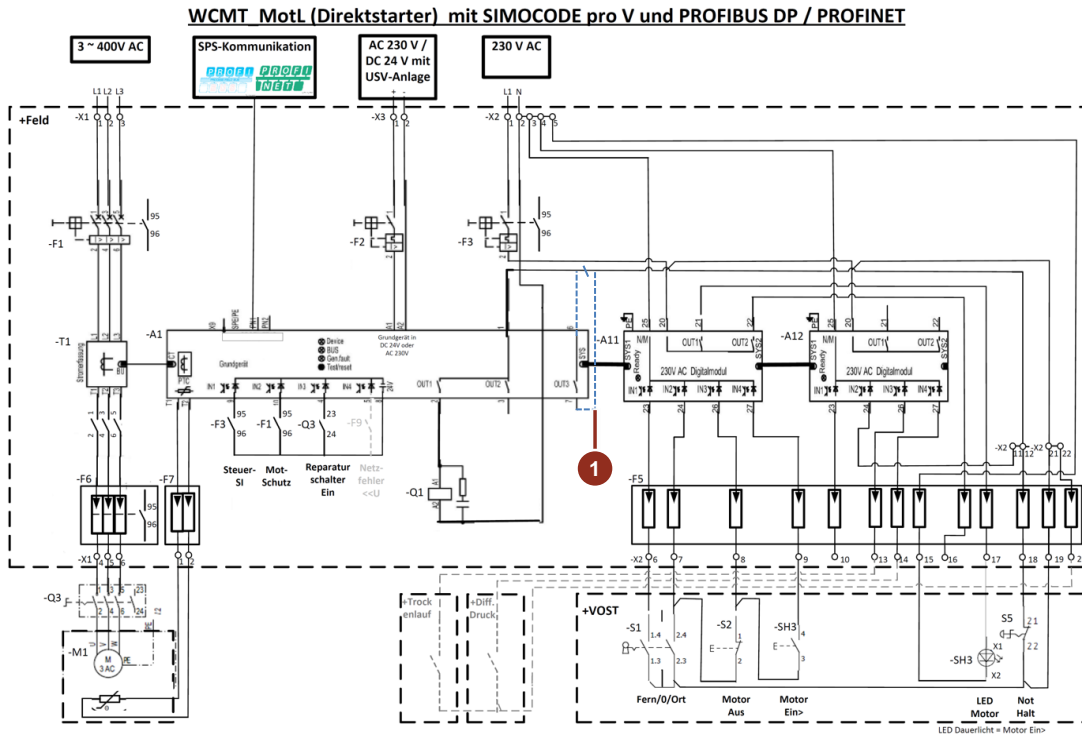
Figure 2-41



2.2.16 Circuit diagram for SIMOCODE pro V / (PN) with PROFIBUS / (PROFINET)

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

Figure 2-42 Direct starter



1* Integration of the supplemental relay contact BU Out3 in the controller voltage circuit when using "Local Locked"

On-site control is activated via the key-operated switch (-S1 Pos.2). For maintenance and service work on the motor, the repair switch is handed over to "MotL" as a "Maint" function to enable the drive.

The on-site control, after activation by a key switch (-S1), accommodates a switchover between local, drive lock and remote (local / 0 / remote).

The drive is switched on or off by on the hardware level via the connected local control station 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.

2.2.17 WCMT_MotLean_FbMMS03 OS faceplates and icons

Each control module type (WCMT) of the PCS 7 Water Templates receives only one icon 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_FbMMS03" without changes.

NOTE

The used faceplates and icons of "WCMT_MotLean_FbMMS03" are described in the corresponding profile. The profiles are part of this application example; you can obtain them from your regional sales partner.

In the chapter entitled [3 WCMT / \(WEMT\) profiles](#) you will find the description of a profile along with an example.

Further information on the standard PCS 7 OS faceplates and OS icons can be found in the function manual Process Control System PCS 7 Advanced Process Library:
<https://support.industry.siemens.com/cs/ww/en/view/109812806>

2.2.18 WCMT_MotLean_FbMMS03 Panel faceplates/icons

The Panel icons and faceplates form part of the PCS 7 Industry Library and unlike with the PCS 7 OS, they are not provided automatically for the Control Module Types (WCMTs) of the PCS 7 Water Templates. The user separately creates plant-specific screens in TIA Portal V17 for IPC/Panel monitoring and control.

NOTE

The used faceplates and icons of "WCMT_MotLean_FbMMS03" are described in the corresponding profile. The profiles are part of this application example; you can obtain them from your regional sales partner.

In the chapter entitled [3 WCMT / \(WEMT\) profiles](#) you will find the description of a profile along with an example.

For further information and configuration aids relating to Panel integration, refer to the article: "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 the Industry Library manual for PCS 7:

<https://support.industry.siemens.com/cs/ww/en/view/109805917>

2.3 WCMT_MotSpdCon_FbDrv03 template

The "WCMT_MotSpdCon_FbDrv03" template describes the coupling between the SINAMICS G120X frequency converter and the automation solution with fieldbus connection (PROFIBUS DP / PROFINET). Send/receive telegrams in the automation system are processed via the driver block FbDrive from the APL.

When comparing the templates "WCMT_MotSpdCon_FbDrv03" and "WCMT_MotLean_FbCom03" from chapter 2, the CFCs differ only in Sheet 1, Sheet 4 and Sheet 5. The blocks and logic ops in Sheet 2 and Sheet 3 are functionally identical. The specific contents of "WCMT_MotSpdCon_FbDrv03" are explained in detail in this chapter.

The standard hardware catalog in the HW Config provides the various device connections for SINAMICS G120X (telegram types 1 and 20) for connecting via PROFIBUS DP or PROFINET for the frequency converter type. To achieve the best use of default data for the template "WCMT_MotSpdCon_FbDrv03", it is advisable to select only telegram type 20. This telegram type is reserved by default for SINAMICS G120X in the HW catalog of SIMATIC Manager. Telegram type 1 will not be described in more detail in connection with the "WCMT_MotSpdCon_FbDrv03" templates.

The following function manuals describe the configuration of PROFIBUS DP / PROFINET communication with a SINAMICS G120X:

SINAMICS G120X:

<https://support.industry.siemens.com/cs/ww/en/view/109801512>

The hardware plans and GSDML files for the SINAMICS G120X are stored in the folders "...\\Swl__Lib\\Sinamics\\Library\\PROFIBUS\\" and "...\\Swl__Lib\\Sinamics\\Library\\PROFINET\\".

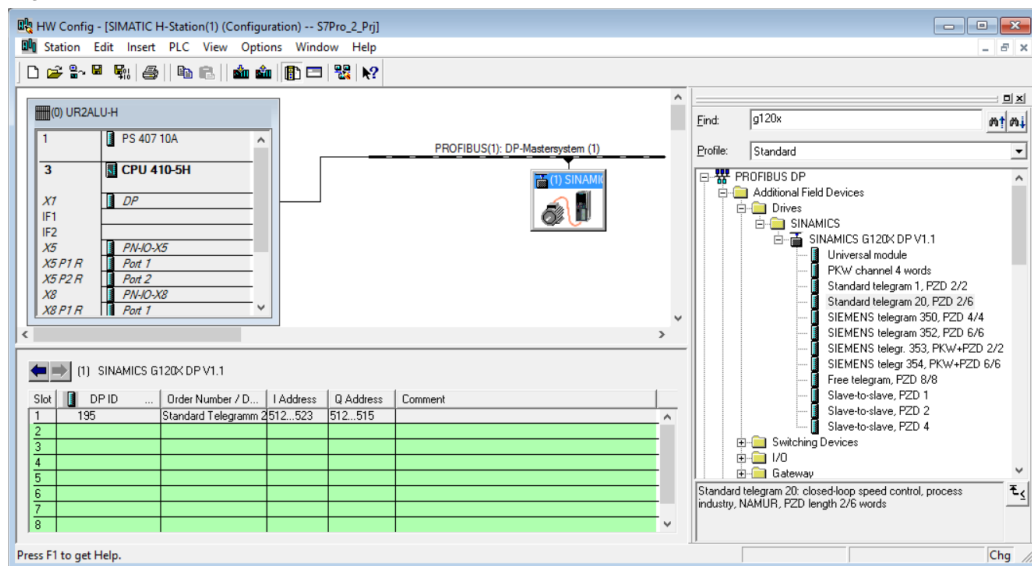
The use of "WCMT_MotSpdCon_FbDrv03" for the SINAMICS G120X is the same whether communicating via PROFIBUS DP or PROFINET. In hardware terms, these differ for the SINAMICS G120P only in the model CU230P-2 DP or CU230P-2 PN:

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

and in the case of the SINAMICS G120X, only in its dimensions, which directly impact the electrical active power:

- CU type with the size FSA...FSJ
- Order no. (item number)

Figure 2-43

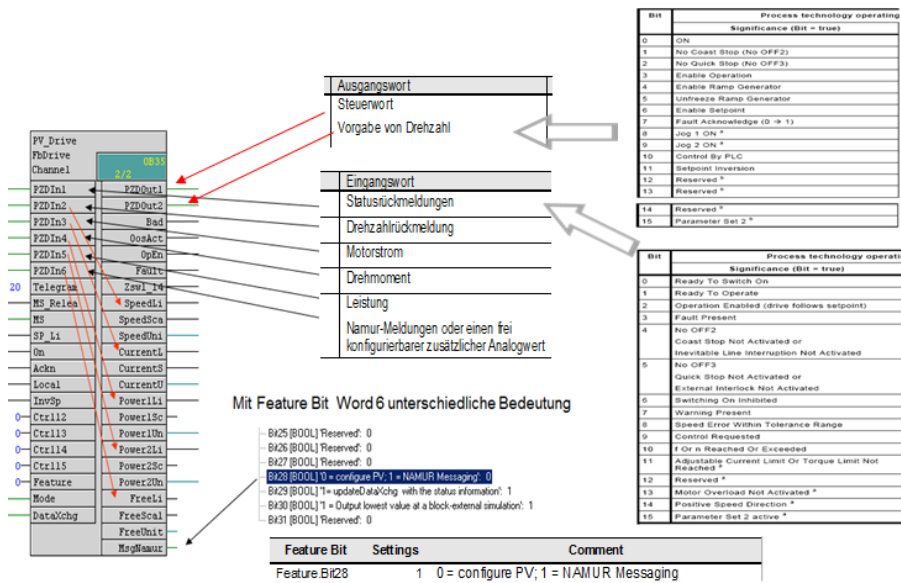


The following Figure gives a schematic description of the input/output interfaces of the SINAMICS G120X and the channel block "FbDrive". The telegram type 20 contains 6 input words and 2 output words, which are represented at the channel block FbDrive by the inputs <PZDIn1> to <PZDIn6> and the outputs <PZDOut1> and <PZDOut2>.

Input words:

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

Figure 2-44



By programming Feature Bit 28 at the "FbDrive" driver block, "PZDIn6" can be used either for the transmission of Namur messages or for the transmission of an additional freely selectable analog value/digital input values D0...D5. The selection is made via feature bit 28 (signal = 0) on the driver block "FbDrive". Refer to the Table below for Feature Bit allocation:

Table 2-8

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 upstream diagnostics block
Feature.Bit30	1	Bit = 0: If an input parameter has the simulation value 16#60, the value 16#0000 is issued at the output parameter "PZDOut1". Bit = 1: If an input parameter has the simulation value 16#60, the value is written to the field device.

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

Table 2-9

Bit	Signal name	0 signal	1 signal
00	Fault in the frequency converter 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	Motor overload	No	Yes
07	Bus fault	No	Yes
08	External safety trip	No	Yes

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Bit	Signal name	0 signal	1 signal
09	Error motor 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 in "FbDrive" (Feature Bit 28 = 1) are used, the messages provided must be retroactively given further interconnections by the user at the conversion block "MsgNamur" (W_BO).

The Tables show the configuration of a freely selectable analog value, for example of a motor temperature or external wiring of the digital input periphery DI0...DI5, for a hardware-level local control station with input word "PZDI6":

Table 2-10

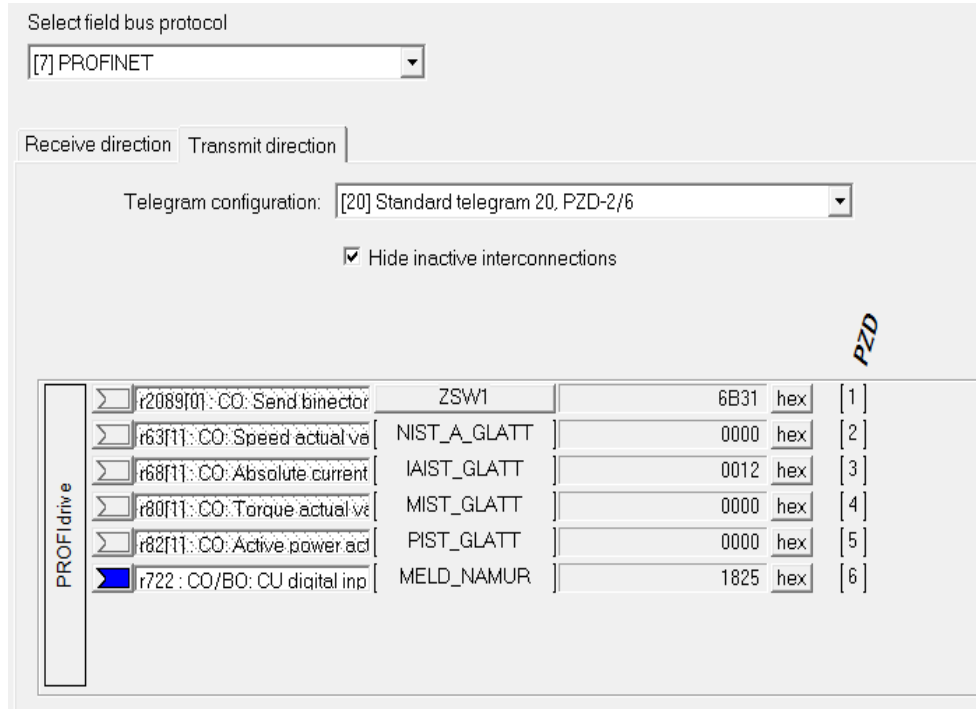
WORD	Signal name	Measuring range	Unit
PIW	Motor temperature	0.0 ... 150.0	°C

Table 2-11

Bit	Signal name	0 signal	1 signal
0	D0 = repair switch	Off	On
1	D1 = Local HW	Off	On
2	D2 = Remote HW	Off	On
3	D3 = Motor stop button	Bad	Good
4	D4 = Feedback signal (Fwd >)	Off	On
5	D5 = Motor protection tripped or Emergency Stop	Bad	Good
6	Not used	-	-
7	Not used	-	-

To further manipulate the digital input periphery of the SINAMICS G120X, the index "r722" must be assigned as a parameter in the fieldbus range for telegram 20 /PZE 6 using the IOP-2⁵, or, alternatively, by WLAN using the Smart Access Module (optional).

Figure 2-45



Binary commands and analog setpoints are issued from the automation system to the SINAMICS via the output values <PZDOut1> and <PZDOut2>.

Output words:

- Output word <PZDOut1> = binary commands to the frequency converter
- Output word <PZDOut2> = rotational speed setpoint value specification to the frequency converter

For further information about the configuration of frequency converters, 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>

Manual for SINAMICS G120X inverters:

<https://support.industry.siemens.com/cs/ww/en/view/109801512>

Standard PCS 7 and WinCC/S7 Water Templates for the Water Industry:

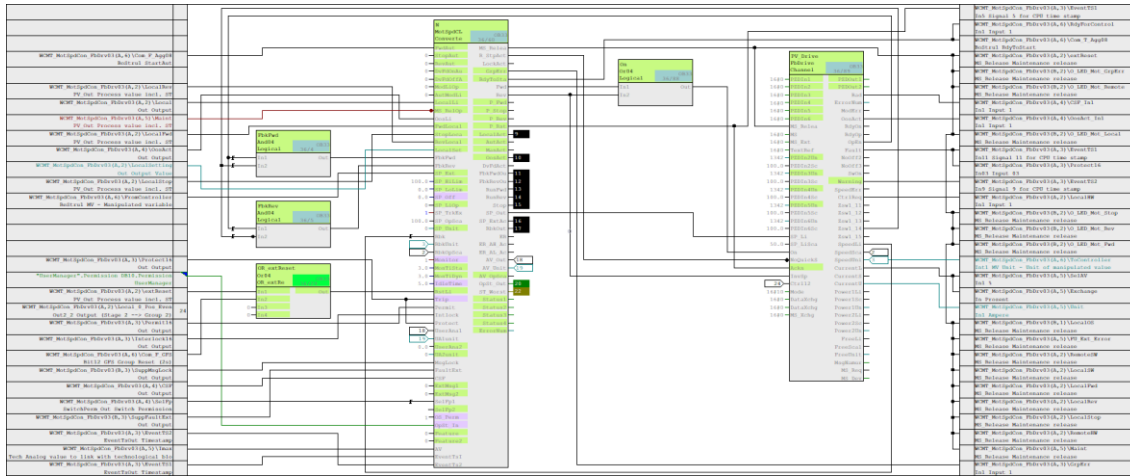
<https://support.industry.siemens.com/cs/ww/en/view/78604785>

NOTE

⁵ IOP-2 = Intelligent Operator Panel - 2nd generation

2.3.1 CFC Chart Partition A/Sheet 1

Figure 2-46



In Chart Partition A/Sheet 1, "WCMT_MotSpdCon_FbDrv03" provides a SINAMICS G120X frequency converter with two directions of rotation via an APL fieldbus driver block, "FbDrive". Here, the driver block supplies/vacates "MotSpdCL" cyclically via Send and Receive telegrams with the SINAMICS G120X.

The template "WCMT_MotSpdCon_FbDrv03" differs from "WCMT_MotLean_FbCom03" in a number of ways:

1. Technological core functions, including fieldbus connection (PROFIBUS DP/PROFINET)
2. Operating hours counter based on the direction of rotation
3. Frequency converter general fault consisting of
 - a. Motor protection,
 - b. Overtemperature,
 - c. Overload
 rather than specific classified faults
4. Conversion of motor current from % to Amperes
5. Pre-configured coupling to "WCMT_Aggr0803"

The "FbDrive" provided in PCS 7 automatically connects to the device type configured in the HW config during the compiling process. This requires the activation of the compiler option "Generate with block driver".

NOTE

It is crucial to program the same peripheral number for PIW and POW (e.g. PIW 512 und POW 512) when entering addresses in the HW config for automatic interconnection of the peripheral address in the CFC.

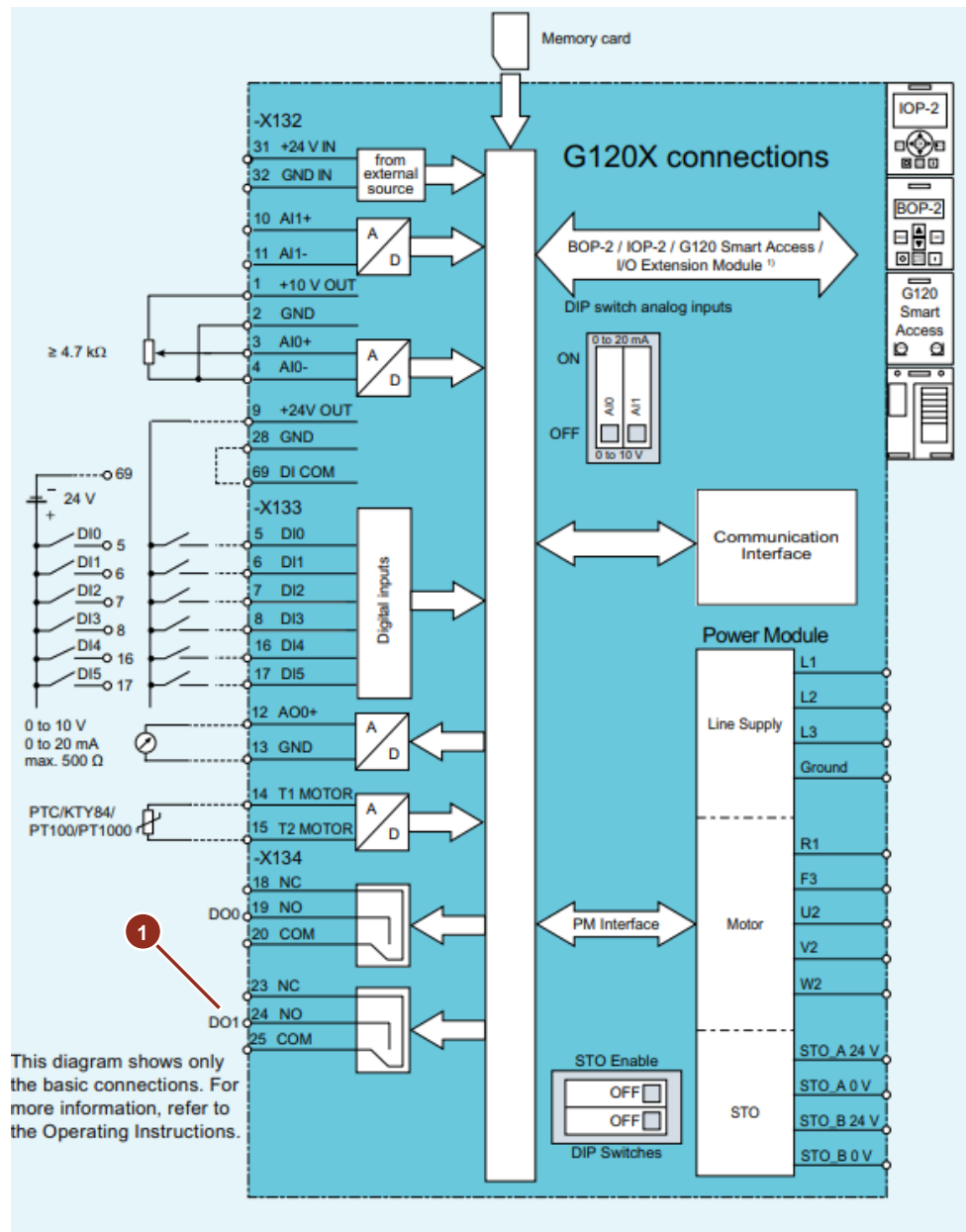
With telegram type 20, "FbDrive" provides four analog values from the frequency converter via the "FbDrive" outputs. The analog value "RPM feedback" is output via the <SpeedLi> output. This is interconnected directly to the <Fbk> input of <MotSpdCL>.

2 Water-specific control module types

"FbDrive" relays the motor current to the <CurrentLi> output of the Exchange block in Chart Partition A/Sheet 5. Subsequent processing is functionally the same as described in detail in chapter [2.2.5 CFC Chart Partition A/Sheet 5](#).

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

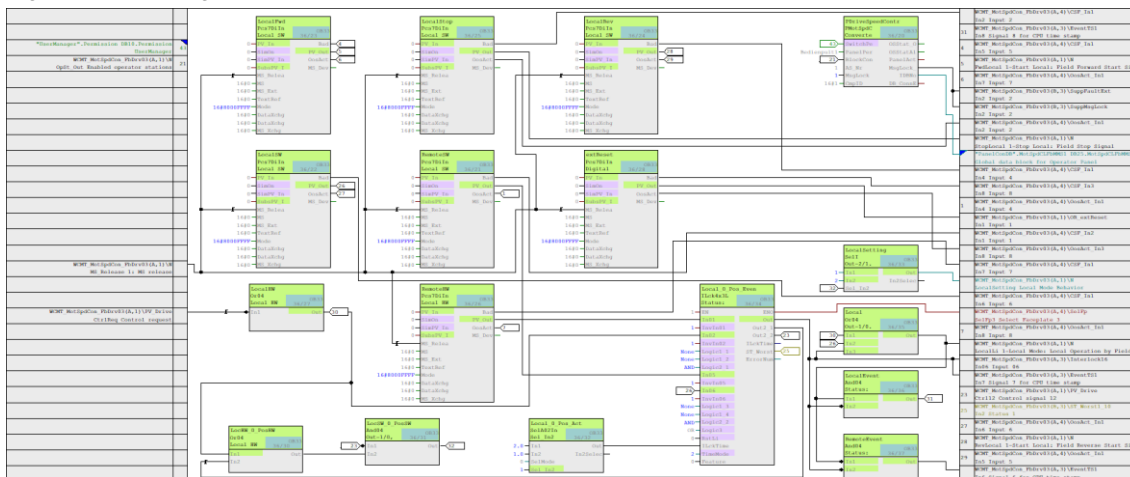
Figure 2-47 Figure for SINAMICS G120X with PROFINET and PROFIBUS



1* Integration of the DO1 relay contact "Local Locked" only if using "LocalSW-0-Pos" via PCS 7 control command "Ctrl 12" = Bit 12 of "PZDOut 1".

2 Water-specific control module types

Figure 2-49 Third-generation local control stations



When activated by a key switch, the local control accommodates a switchover between local, remote and a neutral intermediate position ("Local-0-Remote"). With the simultaneous use of both variants of local control ("LocalSW" + "LocalSW"), the hardware-based control ("LocalSW") almost always has priority over the software-based control ("LocalSW").

Exception

Regardless of the local on-site "LocalHW" switch position, the local "LocalSW" on-site control automatically receives the higher operator permission level when the switch is in the neutral intermediate position "(0 position) = drive lock".



WARNING

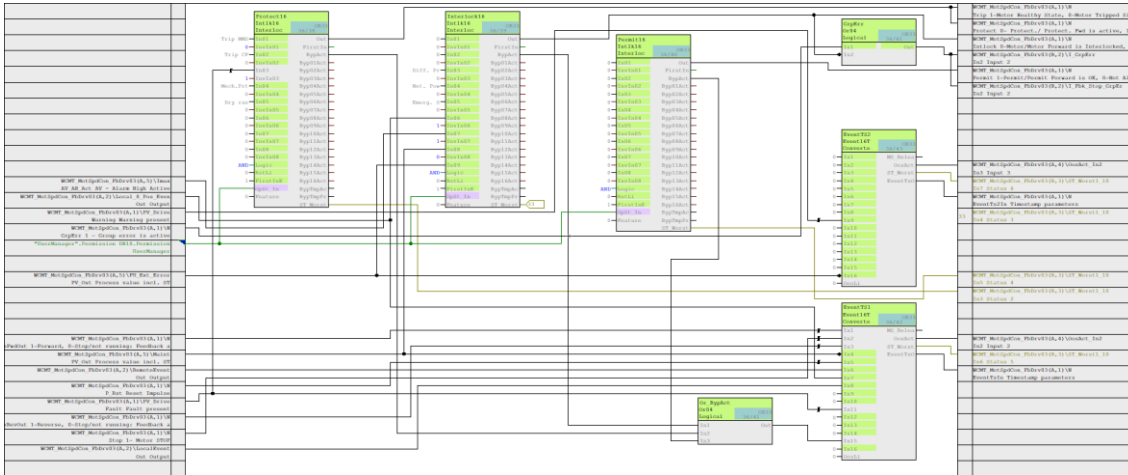
Important safety warning:

In order for the "LocalSW = 0-Pos" drive lock described above to also take effect in the hardware-level controller voltage circuit of the drive, it must be additionally interlocked via a digital output on the SINAMICS (Local Locked) by way of a relay contact on the basic unit – or, alternatively, via the Extension Module output (G120X only). See examples on page 77 or 78. If this is not taken into account, then even when the "LocalSW" drive lock is active, it will still be possible to operate the drive via "LocalHW" with the On/Off pushbuttons in the control voltage circuit.

2.3.3 CFC Chart Partition A/Sheet 3

The description is the same as that for "WCMT_MotLean_FbCom03". Further information can be found in chapter [2.1.3 CFC Chart Partition A/Sheet 3](#).

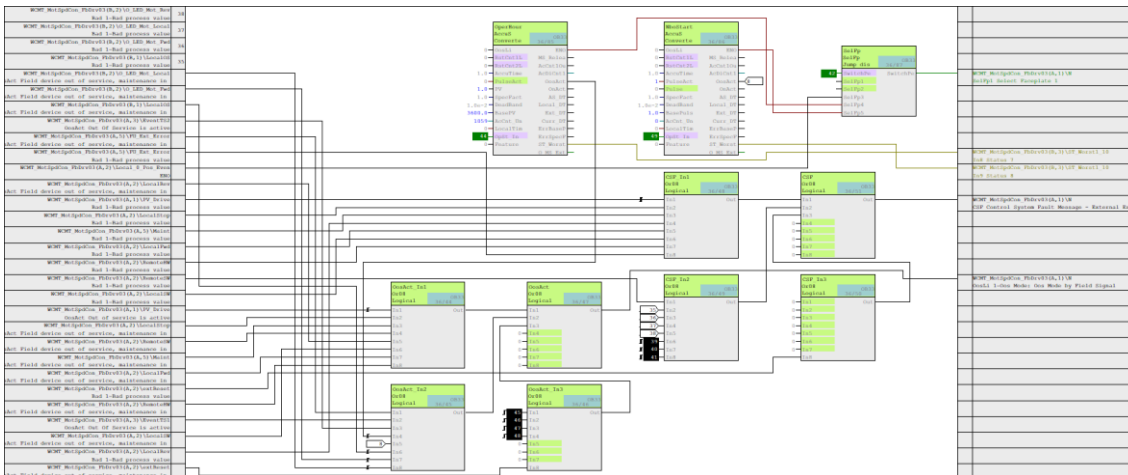
Figure 2-50



2.3.4 CFC Chart Partition A/Sheet 4

The description is the same as that for "WCMT_MotLean_FbCom03". Further information can be found in chapter [2.1.4 CFC Chart Partition A/Sheet 4](#).

Figure 2-51

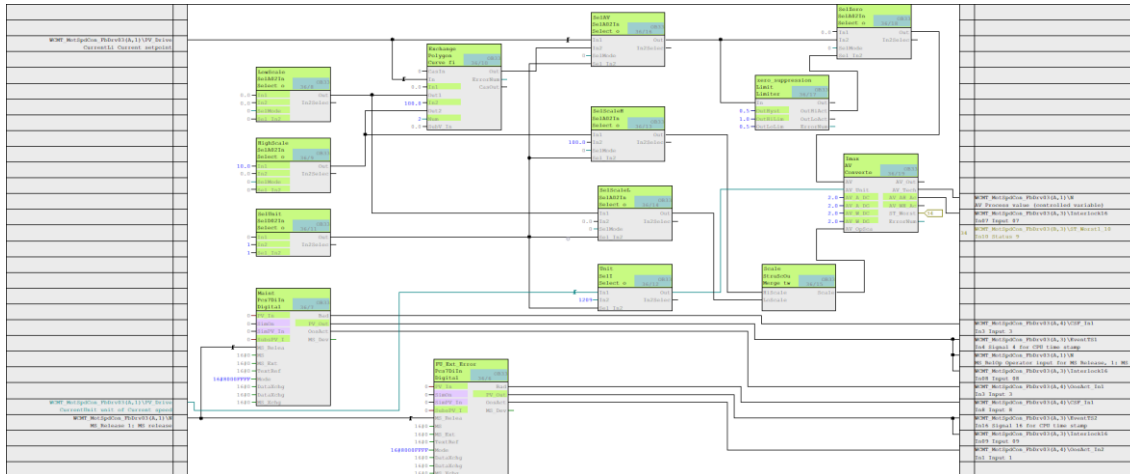


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2.3.5 CFC Chart Partition A/Sheet 5

The interconnected "Motor current" is subsequently used by the PCS 7 "FbDrive" driver block in Chart Partition A/Sheet 5 of "WCMT_MotSpdCL_FbDrv03".

Figure 2-52



A programmable delay time suppresses an alarm message in case "I_{max}" is exceeded for a brief time (chatter suppression). If this time is exceeded and the value is still > "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.

The motor current is interconnected with "MotSpdCL" via <AV> in "WCMT_MotSpdCL_FbDrv03" [CFC Chart Partition A/Sheet 1](#). An additional Limit View is provided in "MotSpdCL" on the PCS 7 OS. Measuring range start/finish and four configurable limits are additionally available to enable the user to monitor and control the motor current.

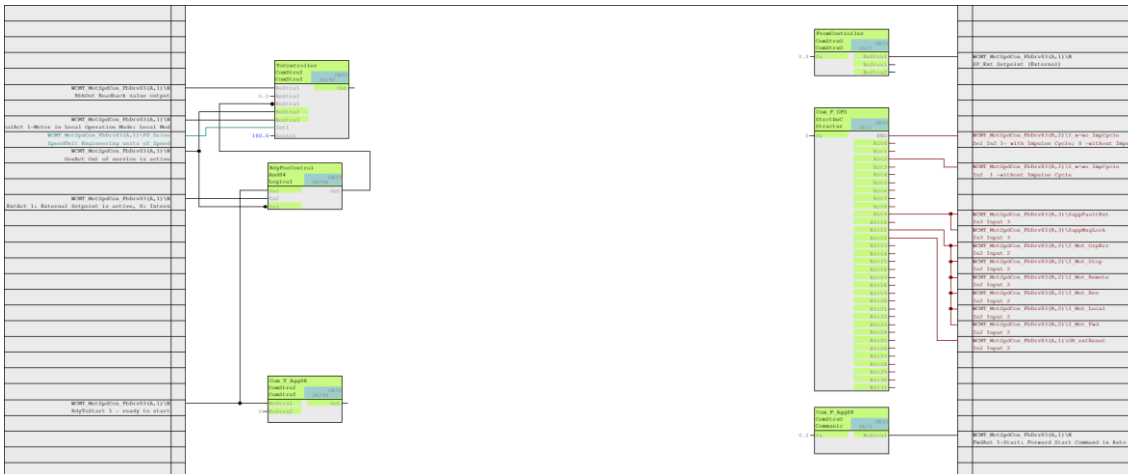
2.3.6 CFC Chart Partition A/Sheet 6

The PCS 7 Water Templates keep the range ready for further communication enhancements in all Chart Partitions A/Sheet 6. This Chart Partition is conceptually ready for data cross-traffic, serial connections or remote control technology.

For controller and motorized sluice blocks as well as frequency converters, prefabricated switching blocks are provided which can be swiftly and customizably interconnected with one connection (plug and coupling). This pre-packaged variant can be extended at any time to suit the project; it is designed for rapid connection with a "WCMT_Aggr0803".

2 Water-specific control module types

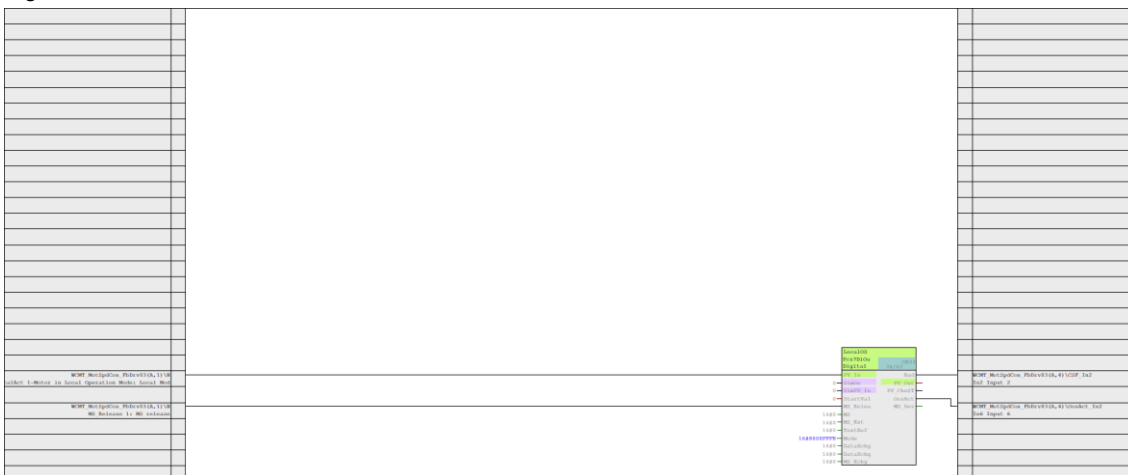
Figure 2-53



In Chart Partition A/Sheet 6 of WCMT_FbDrive_FbMMS03, the interconnections are functional, as described in chapter [2.1.6 CFC Chart Partition A/Sheet 6](#).

2.3.7 CFC Chart Partition B/Sheet 1

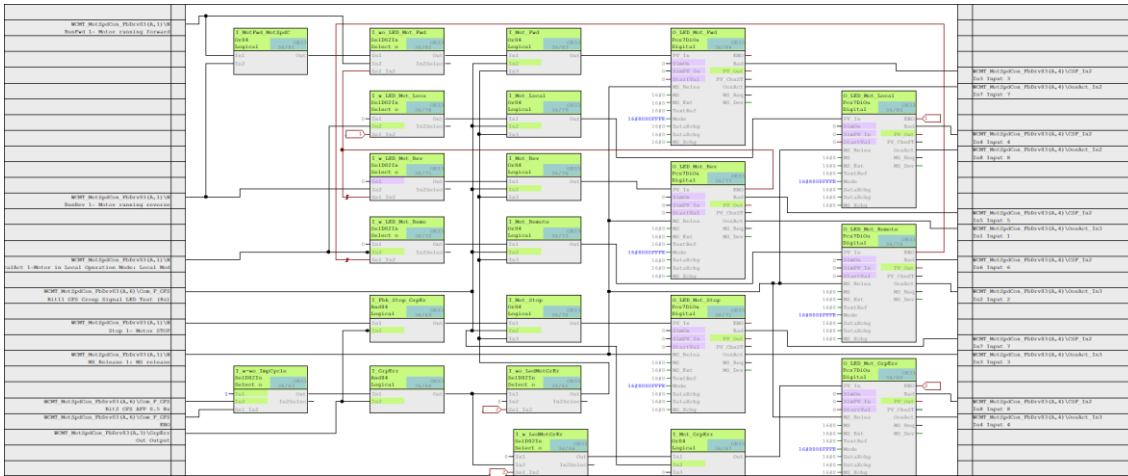
Figure 2-54



The configuration matches that of "WCMT_MotLean_FbCom03" Chart Partition B/Sheet 1. Further information can be found in chapter [2.1.7 CFC Chart Partition B/Sheet 1](#).

2.3.8 CFC Chart Partition B/Sheet 2

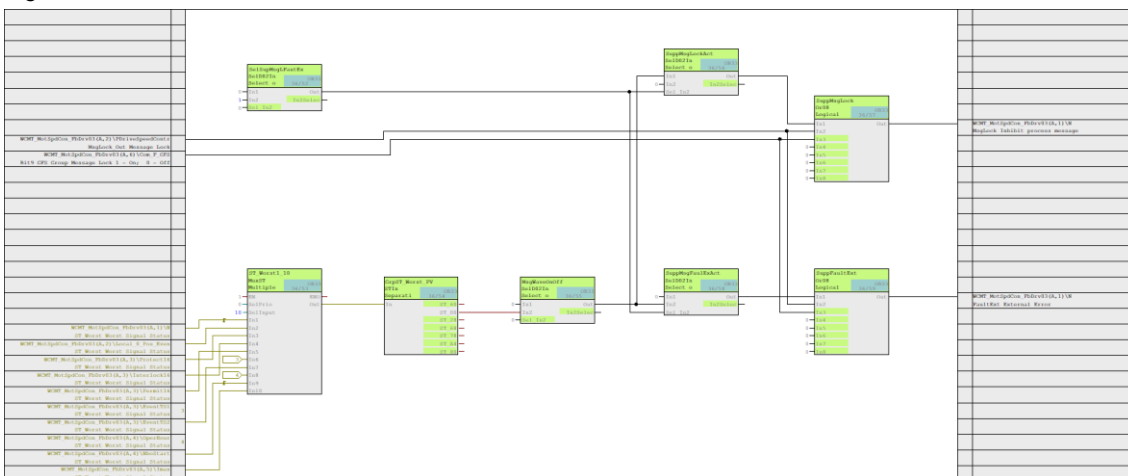
Figure 2-55



The configuration matches that of "WCMT_MotLean_FbCom03" Chart Partition B/Sheet 2. You can find further information in chapter [1.11.8 CFC Chart Partition B/Sheet 2](#).

2.3.9 CFC Chart Partition B/Sheet 3

Figure 2-56



The configuration matches that of "WCMT_GFS03", Chart Partition B/Sheet 3. Further information can be found in chapter: [1.11.9 CFC Chart Partition B/Sheet 3](#).

2.3.10 CFC Chart Partition B/Sheet 4 through 6

CFC Chart Partition B/Sheets 4 through 6 are reserve charts.

Note

In case of future expansions, it is recommended not to fill these Chart Partitions and leave them empty until further notice.

2.3.11 WCMT_MotSpdCon_FbDrv03 OS faceplates and icons

Each control module type (WCMT) of the PCS 7 Water Templates receives only one icon 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_FbDrv03" without changes.

NOTE

The used faceplates and icons of "WCMT_MotSpdCon_FbDrv03" are described in the corresponding profile. The profiles are part of this application example; you can obtain them from your regional sales partner.

In the chapter entitled [3 WCMT / \(WEMT\) profiles](#) you will find the description of a profile along with an example.

Further information on the standard PCS 7 OS faceplates and OS icons can be found in the function manual Process Control System PCS 7 Advanced Process Library:
<https://support.industry.siemens.com/cs/ww/en/view/109812806>

2.3.12 WCMT_MotSpdCon_FbDrv03 Panel faceplates/icons

The Panel icons and faceplates form part of the PCS 7 Industry Library and unlike with the PCS 7 OS, they are not provided automatically for the Control Module Types (WCMTs) of the PCS 7 Water Templates. The user creates plant-specific screens for Panel/IPC monitoring and control separately via TIA Portal V17.

NOTE

The used faceplates and icons of "WCMT_MotSpdCon_FbDrv03" are described in the corresponding profile. The profiles are part of this application example; you can obtain them from your regional sales partner.

In the chapter entitled [3 WCMT / \(WEMT\) profiles](#) you will find the description of a profile along with an example.

For further information and configuration aids relating to Panel integration, refer to the article: "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 the Industry Library manual for PCS 7:

<https://support.industry.siemens.com/cs/ww/en/view/109805917>

2.4 WCMT_SitrMAG6000_Fb03 Template

The PCS 7 Water Template "WCMT_SitrMAG6000_Fb03" provides descriptions of a measuring transducer-based flowmeter, type SITRANS MAG 6000 with fieldbus connection. Measuring transducers and the automation system (AS) are connected via PROFIBUS DP. Data are handled in the automation system via an APL-compliant block, "FbMag6T", from the SITRANS Library.

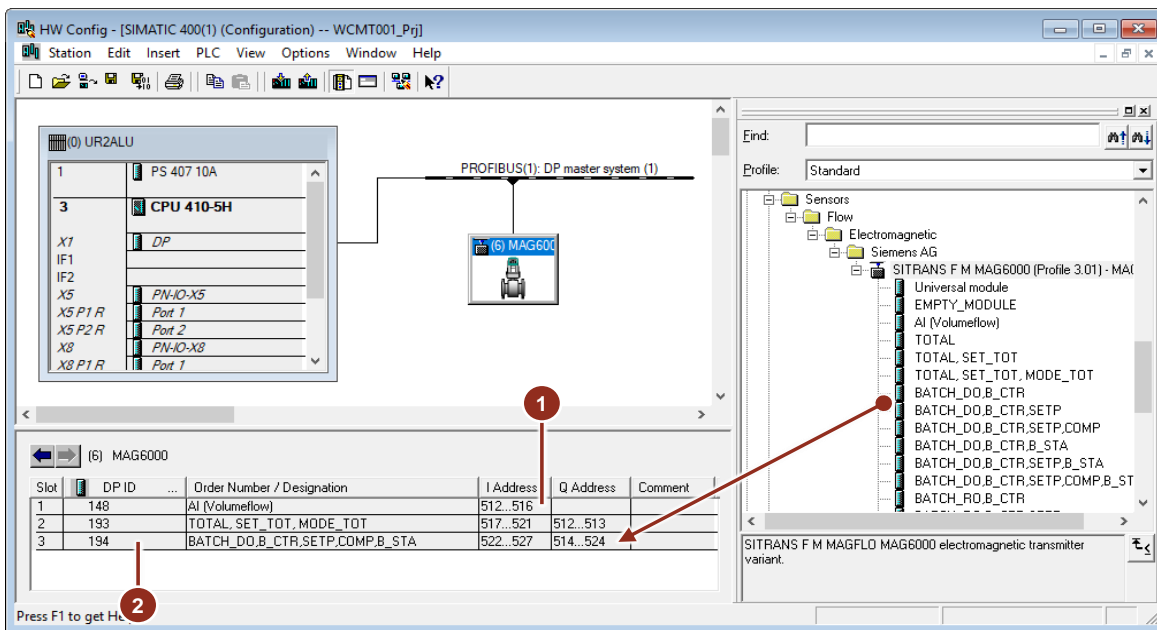
When compared to the underlying scheme of "WCMT_MotLean_FbMMS03" described above, the "WCMT_SitrMAG6000_Fb03" in Chart Partition A/Sheets 1 through 4 still differs in some regards.

The GSDML files for SITRANS are stored in the folders "...\\Swl__Lib\\Sitrans\\Library\\PROFIBUS\\" and "...\\Swl__Lib\\Sitrans\\Library\\PROFINET\\".

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

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

Figure 2-57



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

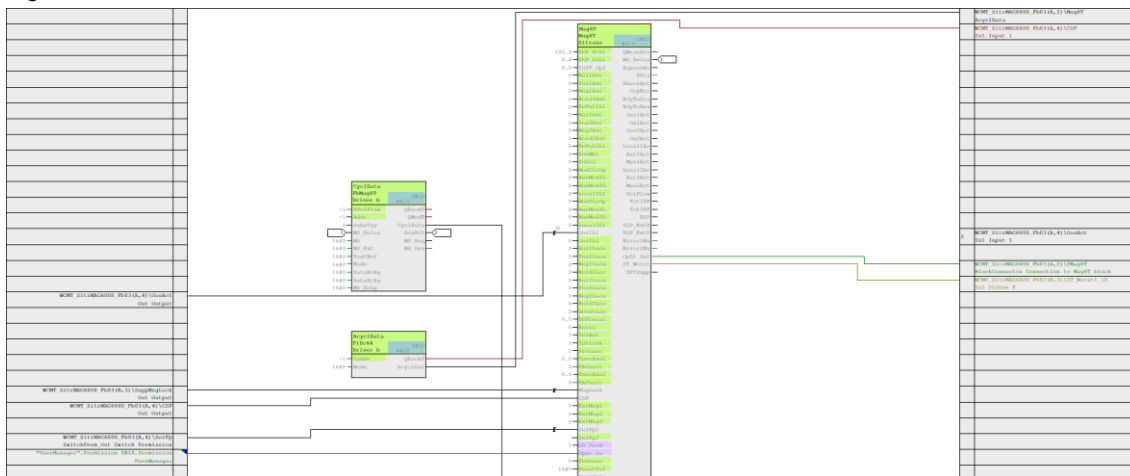
2.4.1 CFC Chart Partition A/Sheet 1

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

The interconnection of the blocks has been prepared as an example in the template "WCMT_SitrMAG6000_Fb03". In the project, the user only specifies the functions depending on the specific task. After a subsequent PCS 7 OS full compilation, the faceplates will be ready for monitoring and control depending on the above-mentioned function selection. Cyclic and acyclic data are transmitted in the "WCMT_SitrMAG6000_Fb03" template between the MAG6000 flowmeter and the automation system via PROFIBUS DP. APL-compliant representations of FbMag6T are also available:

1. Operating modes
 - Working/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. Message suppression

Figure 2-58



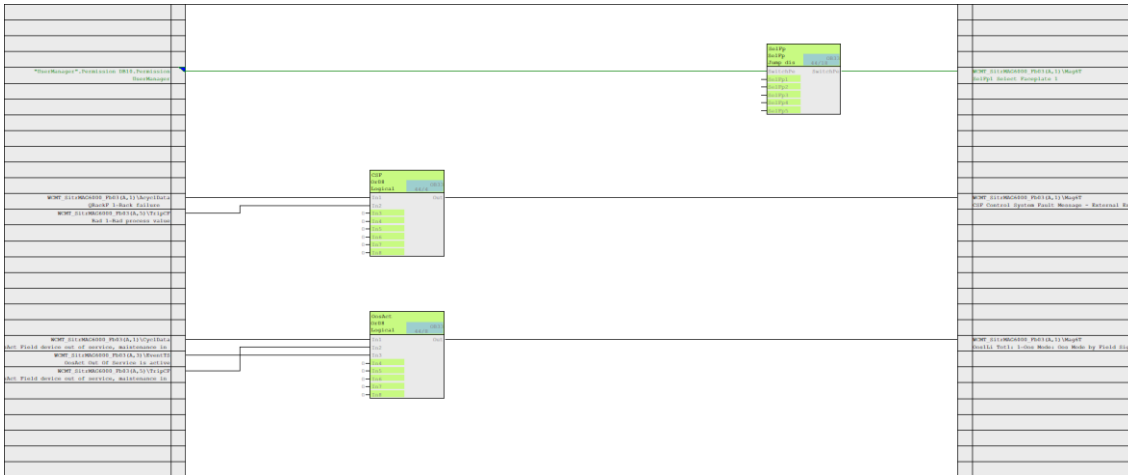
NOTE

Additional information is available in the SITRANS Library manual at the following link:
<https://support.industry.siemens.com/cs/ww/en/view/109811653>

2.4.4 CFC Chart Partition A/Sheet 4

The jump distributor "SelFp" is identical to the solution from "WCMT_MotLean_FbCom03". Further information can be found in chapter [2.1.4 CFC Chart Partition A/Sheet 4](#).

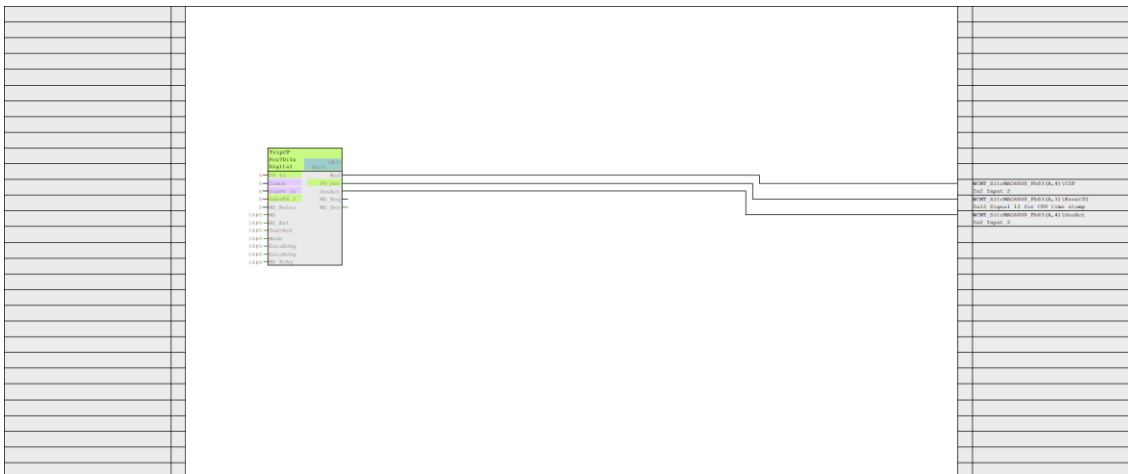
Figure 2-61



2.4.5 CFC Chart Partition A/Sheet 5

Sensor monitoring has been implemented in Chart Partition A/Sheet 5 below.

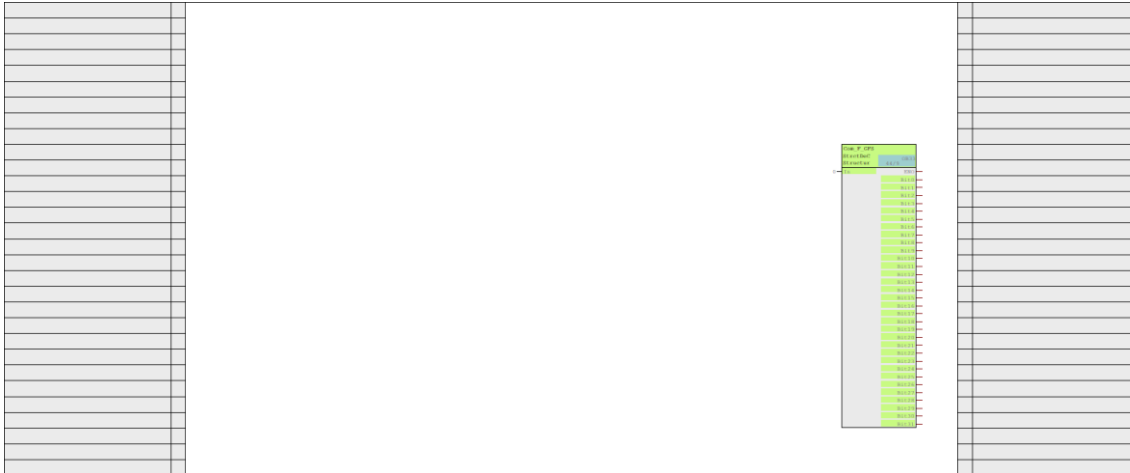
Figure 2-62



2.4.6 CFC Chart Partition A/Sheet 6

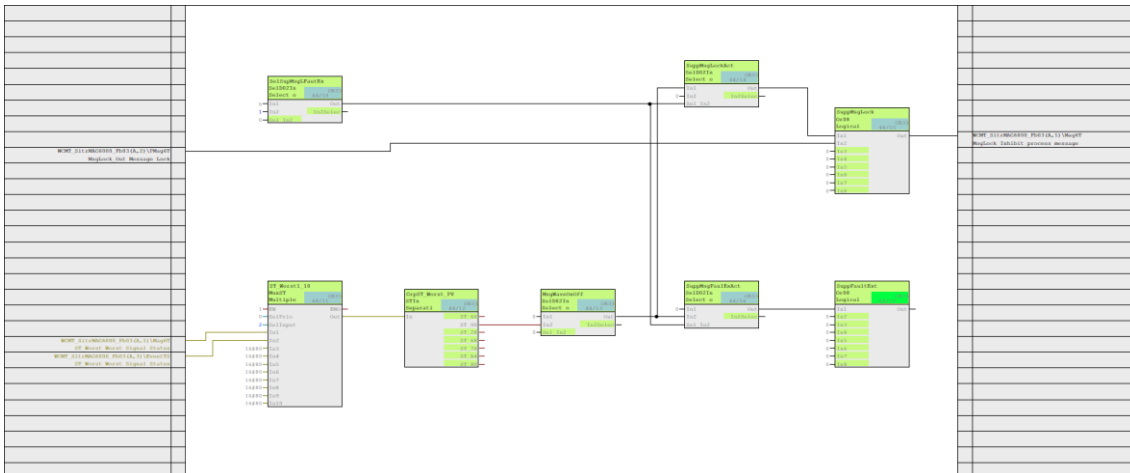
In Chart Partition A/Sheet 6 of "WCMT_MotLean_FbMMS03", the interconnections are functional, as described in chapter [2.1.6 CFC Chart Partition A/Sheet 6](#).

Figure 2-63



2.4.7 CFC Chart Partition B/Sheet 3

Figure 2-64



The configuration matches that of "WCMT_GFS03", Chart Partition B/Sheet 3. Further information can be found in chapter: [1.11.9 CFC Chart Partition B/Sheet 3](#).

2.4.8 CFC Chart Partition B/Sheet 1, 2 and 4 through 6

CFC Chart Partition B/Sheets 1, 2 and 4 through 6 are reserve charts.

Note In case of future expansions, it is recommended not to fill these Chart Partitions and leave them empty until further notice.

2.4.9 WCMT_SitrMAG6000_Fb03 OS faceplates and icons

Each control module type (WCMT) of the PCS 7 Water Templates receives only one icon 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 "SitrMAG6000" are used in "WCMT_SitrMAG6000_Fb03" without changes.

NOTE

The used faceplates and icons of "WCMT_SitrMAG6000_Fb03" are described in the corresponding profile. The profiles are part of this application example; you can obtain them from your regional sales partner.

In the chapter entitled [3 WCMT / \(WEMT\) profiles](#) you will find the description of a profile along with an example.

Further information on the standard PCS 7 OS faceplates and OS icons can be found in the function manual Process Control System PCS 7 Advanced Process Library:
<https://support.industry.siemens.com/cs/ww/en/view/109812806>

2.4.10 WCMT_SitrMAG6000_Fb03 Panel faceplates/icons

The Panel icons and faceplates form part of the PCS 7 Industry Library and unlike with the PCS 7 OS, they are not provided automatically for the Control Module Types (WCMTs) of the PCS 7 Water Templates. The user creates plant-specific screens for Panel/IPC monitoring and control separately via TIA Portal V17.

NOTE

The used faceplates and icons of "WCMT_SitrMAG6000_Fb03" are described in the corresponding profile. The profiles are part of this application example; you can obtain them from your regional sales partner.

In the chapter entitled [3 WCMT / \(WEMT\) profiles](#) you will find the description of a profile along with an example.

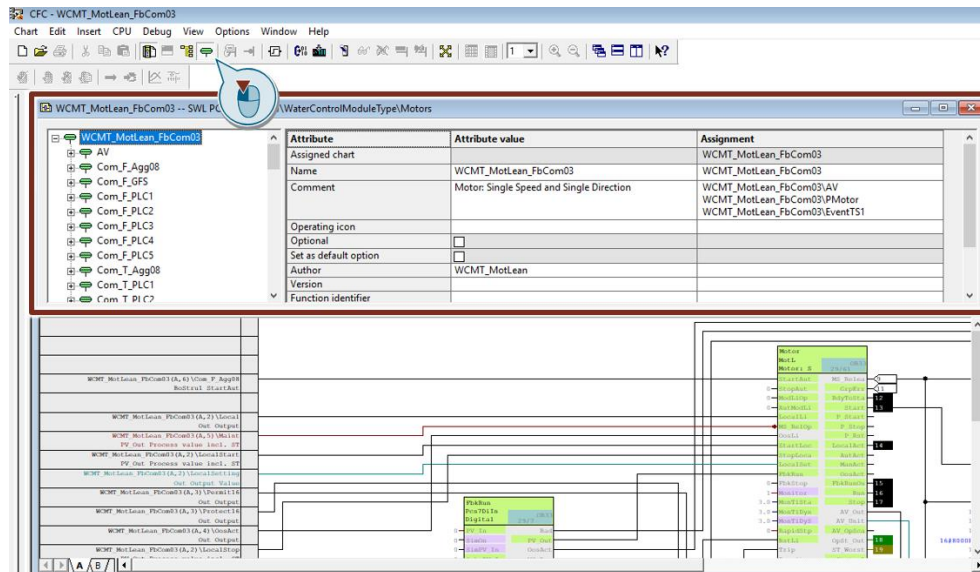
For further information and configuration aids relating to Panel integration, refer to the article: "Integration of Operator Panels in SIMATIC PCS 7 with the Industry Library"
<https://support.industry.siemens.com/cs/ww/en/view/50708061>

or the Industry Library manual for PCS 7:
<https://support.industry.siemens.com/cs/ww/en/view/109805917>

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

The Water Control Module Types (WCMTs) are suitable for use with PCS 7, PCS 7 Plant Automation Accelerator or COMOS. The optional connection and disconnection of the variants is performed with the technological I/Os in the respective instantiated WCMTs. At the same time, data are exchanged with and compared against the PCS 7 Plant Automation Accelerator or COMOS via this interface.

Figure 2-65



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 The WCMT Feature in PCS 7 V9.1 SP2 UC01

Tag extension in the Technological I/Os Editor

With the CMT functionalities implemented since PCS 7 V9.0 SP2, engineers have access to efficient and time-saving tools. To make the best use of these in the WCMTs, all PCS 7 WCMT input/output tags with characteristics relevant to configuration (parameters, signals, limit values, etc.) have been carried over into the Technological I/O Editor. Thanks to this feature, these parameters can be imported into the PCS 7 project from a project EXCEL list via the Plant Automation Accelerator (PAA).

Support for type-instance behavior

This CMT function was likewise introduced in PCS 7 V9.0 SP2. In the function, it is activated by default with a check mark under "Support type-instance behavior" and ensures data synchronization between the WCMT in the master data library and the instance in the project.

If the check mark is removed in the corresponding instance, this instance will no longer be compared against the WCMT from the master data library and thereby loses the continuous synchronization from an imported EXCEL list in PAA/COMOS.

This instance has the status of a process tag type. The input/output tags will behave exactly like I/Os marked in gray.

Further information can be found in the following articles:

Control Module (CM) Technology - Efficient Engineering in SIMATIC PCS 7

<https://support.industry.siemens.com/cs/ww/en/view/109475748>

Engineering efficiency in the interaction of SIMATIC PCS 7 Plant Automation Accelerator, SIMATIC PCS 7 and SIMIT Simulation

<https://support.industry.siemens.com/cs/ww/en/view/109770538>

NOTE

SIMATIC PCS 7 Plant Automation Accelerator (PAA) using a practical example:

<https://support.industry.siemens.com/cs/ww/en/view/109742154>

How do you import signals, parameters, Control Modules and Hardware into the Plant Automation Accelerator (PAA) with Excel Import?

<https://support.industry.siemens.com/cs/ww/en/view/109761468>

2.5.2 Using the PCS 7 Plant Automation Accelerator/COMOS

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

You can also find application examples and further articles on the respective overview pages for PCS 7 Plant Automation Accelerator and/or COMOS.

COMOS overview page: <https://support.industry.siemens.com/cs/ww/en/view/109739837>

PAA overview page: <https://support.industry.siemens.com/cs/ww/en/view/109767120>

3 WCMT / (WEMT) profiles

NOTE

The WCMT profiles were created with PCS 7 V9.0 SP1 and are also valid for PCS 7 V9.1 SP2 UC01.

WCMT and WEMT profiles perform a variety of functions and tasks in describing 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 specifications
(parameters, inputs, outputs, messages, ...)
3. CFCs
4. Circuit Diagrams

You can use the profiles for various applications such as invitations to tender, specification sheets, requirements sheets, system documentation or for commissioning.

You will find all profiles for the individual control module types in the Zip archive "Water_Templates_PCS7_Steckbriefe_V91_en.zip". The profiles are available in "PDF" file format. Your regional Siemens sales partner will provide you with the profiles at no charge.

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

In the following, the profiles will be explained using the example of "WCMT_MotLean_FbMMS03".

3.1 Functional description

Chapter 1 of the profile, "FUNCTIONAL DESCRIPTION", describes the following topics in the respective sub-chapters:

Figure 3-1

1	FUNCTIONAL SPECIFICATION
1.1	INTRODUCTION
1.2	VARIANTS LIST
1.3	STATES
1.4	MODES
1.5	EXCEPTION HANDLING
1.5.1	Fault handling
1.5.2	Restart after fault
1.6	START-UP BEHAVIOUR
1.7	MISCELLANEOUS

3.1.1 Introduction

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

Figure 3-2: "WCMT_MotLean_FbMMS03" profile - chapter 1.1 Introduction

1.1 INTRODUCTION
WCMT_MotLean is used for the control of motors with one control signal.
1.2 VARIANTS LIST

3.1.2 Variants list

Variant formation is no longer applicable with PCS 7 V9.0 SP2. There is only one variant which describes the high-end expansion. You can still assemble any number of variants yourself based on the PCS 7 CMT technology.

Figure 3-3

1.2 VARIANTS LIST					
This chapter describes input and output parameters, interfaces to other modules, statuses and commands.					
• WCMT_MotLean_FbCom					
With all blocks.					
Table 1.2.1 Variants list					
Signal					CMT variant
Block/ Name	Description	Data type	Input / Output		WCMT_MotLean_FbCom
EmergStop					
PV_In	Input value	BOOL	IN		X
ExtReset					
PV_In	Input value	BOOL	IN		X
FbkRun					
PV_In	Input value	BOOL	IN		X
LocalHW					
PV_In	Input value	BOOL	IN		X
LocalSW					
PV_In	Input value	BOOL	IN		X
LocalStart					
PV_In	Input value	BOOL	IN		X
LocalStop					
PV_In	Input value	BOOL	IN		X
Maint					
PV_In	Input value	BOOL	IN		X
Mech_Prot_AH					
PV_In	Input value	BOOL	IN		X
MotorCurrent					
PV_In	Input value	REAL	IN		X

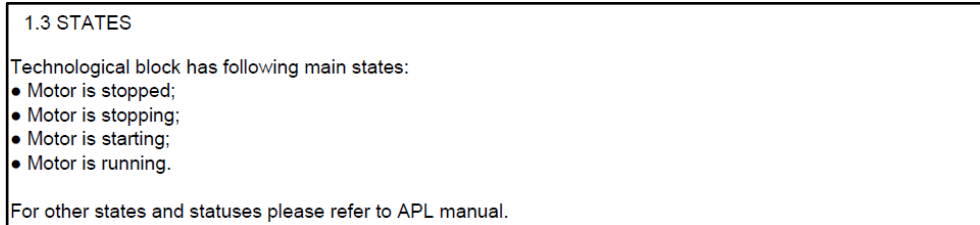
NOTE

The S7 WCMT variants were stored in COMOS/PAA and were automatically generated during instantiation in PCS 7. To configure the WCMT variants without COMOS/PAA in PCS 7, you must activate/deactivate all optional I/Os of the desired variant in the technological I/Os for each instance. Use the configuration table from the profiles to do this. In addition, you can create your own project-related variants from the WCMT by activating or deactivating further options.

3.1.3 States

This chapter describes the principal states of the plant block.

Figure 3-4



Further information regarding the states of these plant blocks can be found in the manual "SIMATIC Process Control System PCS 7 Advanced Process Library (V9.1 SP2)":

<https://support.industry.siemens.com/cs/ww/en/view/109812806>

3.1.4 Command modes

This chapter describes the operating modes of the WCMT.

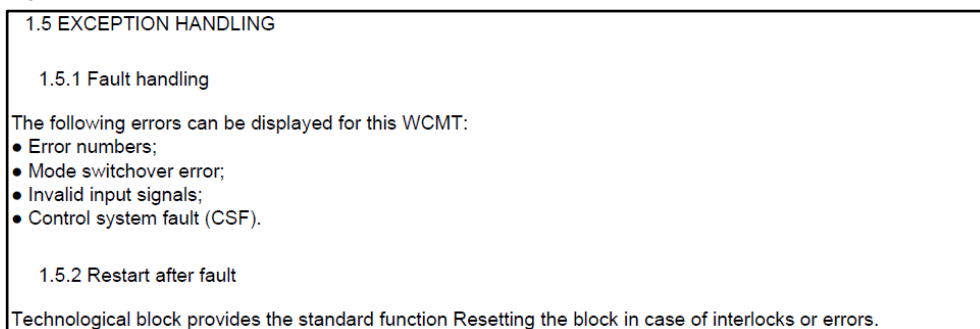
Figure 3-5



3.1.5 Exceptional situations

This chapter deals with states in the event of an error. Refer to the subchapters "Error behavior" and "Restart after error".

Figure 3-6



3.1.6 Startup behavior

This chapter contains information on the startup behavior of the plant block.

Figure 3-7

1.6 START-UP BEHAVIOUR

Use the Feature Bit "Set startup characteristics" on technological block to define the startup characteristics of technological block.
The messages are suppressed after startup for the number of cycles set at RunUpCyc.

3.1.7 Interlock

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

Figure 3-8

1.7 MISCELLANEOUS

On second sheet (Sheet 2) logic for Local - Remote control is prepared. Driver blocks "LocalHW" and "LocalSW" are one group and represent i.e. Field. Driver blocks "RemoteHW" and "RemoteSW" are second group and represent i.e. Control Room. It is possible to have Remote, Local or both controls. HW represents operation without PLC, SW with PLC. In case of HW control, signals are hardwired, and in case of SW control signal are connected to PLC inputs.

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 chapter is divided into the following subchapters:

Figure 3-9

2	DESIGN SPECIFICATION
2.1	PARAMETERS
2.2	INPUTS
2.3	OUTPUTS
2.4	INTERFACES TO OTHER MODULES
2.4.1	Status
2.4.2	Commands
2.5	MESSAGES
2.6	VISUALISATION
2.6.1	Block icons
2.6.2	Block icon states
2.6.3	Faceplates

3.2.1 Parameters

Any existing parameters are listed in this chapter.

Figure 3-10

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 chapter.

Figure 3-11

2.2 INPUTS

Table 2.2.1 Inputs

Parameter	CMT variant			
	Block/ Name	Description	Data type	Default value
AV				
AV	Analog value	REAL	0.0	X
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_Unit	Engineering units of AV	INT	1001	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
CSF				
CSF_In3_In4	Input 4	BOOL	false	X
CSF_In3_In5	Input 5	BOOL	false	X
CSF_In3_In6	Input 6	BOOL	false	X
CSF_In3_In7	Input 7	BOOL	false	X
CSF_In3_In8	Input 8	BOOL	false	X
Com_F_PLC1				
From_PLC_1_6		STRUCT		X
Com_F_PLC2				
From_PLC_7_12		STRUCT		X
Com_F_PLC3				
From_PLC_13_18		STRUCT		X
Com_F_PLC4				
From_PLC_19_24		STRUCT		X
Com_F_PLC5				
From_PLC_25-30		STRUCT		X
Com_T_PLC1				
BoStru1	Control Output to Start	BOOL		X
BoStru2	Reserve	BOOL	false	X
BoStru3	Reserve	BOOL	false	X
BoStru4	Reserve	BOOL	false	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 I/Os of the desired variant in the technological I/Os for each instance. Use the configuration table from the profiles to do this. 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 3-12

2.3 OUTPUTS

Table 2.3.1 Outputs

Parameter	CMT variant			
	Block/ Name	Description	Data type	Default value
AV				
AV_AH_Act	AV - Alarm High Active	BOOL		X
AV_WH_Act	AV - Warning High Active	BOOL		X
Com_F_PLC1				
BoStru1	Feedback Forward	BOOL		X
BoStru2	Feedback Reverse	BOOL		X
BoStru3	Reserve	BOOL		X
BoStru4	Reserve	BOOL		X
BoStru5	Reset	BOOL		X
BoStru6	Maintenance	BOOL		X
Com_F_PLC2				
BoStru1	Local Forward	BOOL		X
BoStru2	Local Stop	BOOL		X
BoStru3	Local Reverse	BOOL		X
BoStru4	Remote HW	BOOL		X
BoStru5	Local HW	BOOL		X
BoStru6	Remote SW	BOOL		X
Com_F_PLC3				

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3.2.4 Interface to other modules

Any existing interfaces are listed in this chapter.

Figure 3-13

2.4 INTERFACES TO OTHER MODULES

WCMT_MotLean does not have interface to other blocks (WCMTs).

2.4.1 Status

<<None>>

2.4.2 Commands

<<None>>

3.2.5 Messages

This chapter has a tabular list of all operating and fault messages that can be triggered from the WCMT message blocks (depending on the variant selected).

Figure 3-14

2.5 MESSAGES

Table 2.5.1 Messages

Message				CMT variant
Block/ Name	Message class	Event	Prio	WCMT_MotLean_FBCom
AV				
MsgEvid1_SIG1	Alarm - high	\$\$BlockComment\$\$ AV - High alarm limit violated	0	X
MsgEvid1_SIG2	Warning - high	\$\$BlockComment\$\$ AV - High warning limit violated	0	X
MsgEvid1_SIG5	Warning - low	\$\$BlockComment\$\$ AV - Low warning limit violated	0	X
MsgEvid1_SIG6	Alarm - low	\$\$BlockComment\$\$ AV - Low alarm limit violated	0	X
EventTTS1				

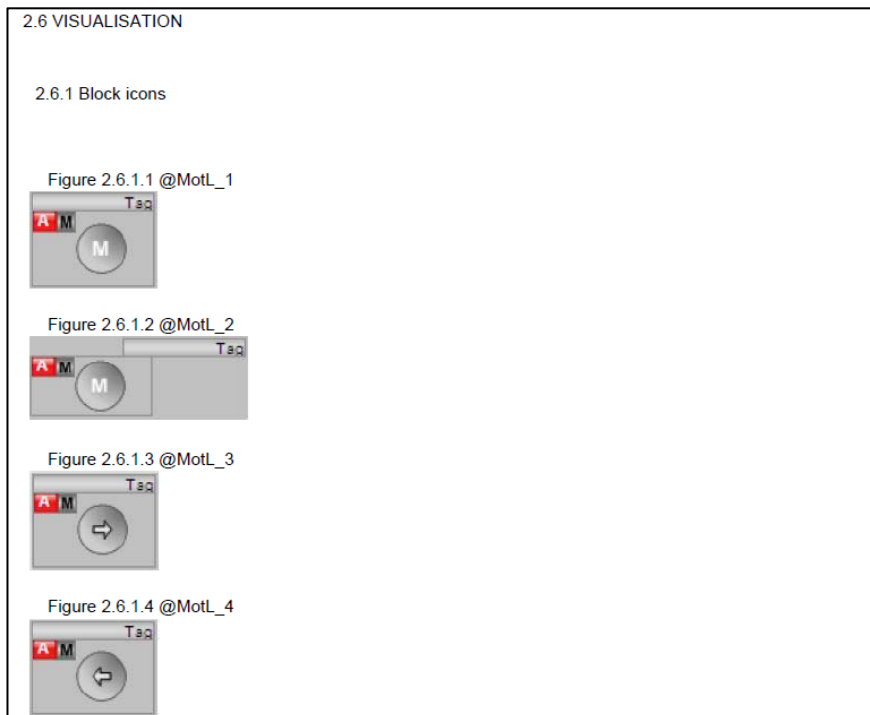
3.2.6 Visualization

In the "Visualization" chapter you will find an overview of icons and faceplates of the plant block for display on the operator station or a Comfort Panel.

Icons

The subsection "Icons" lists the configurable block symbols and the optional Panel icon.

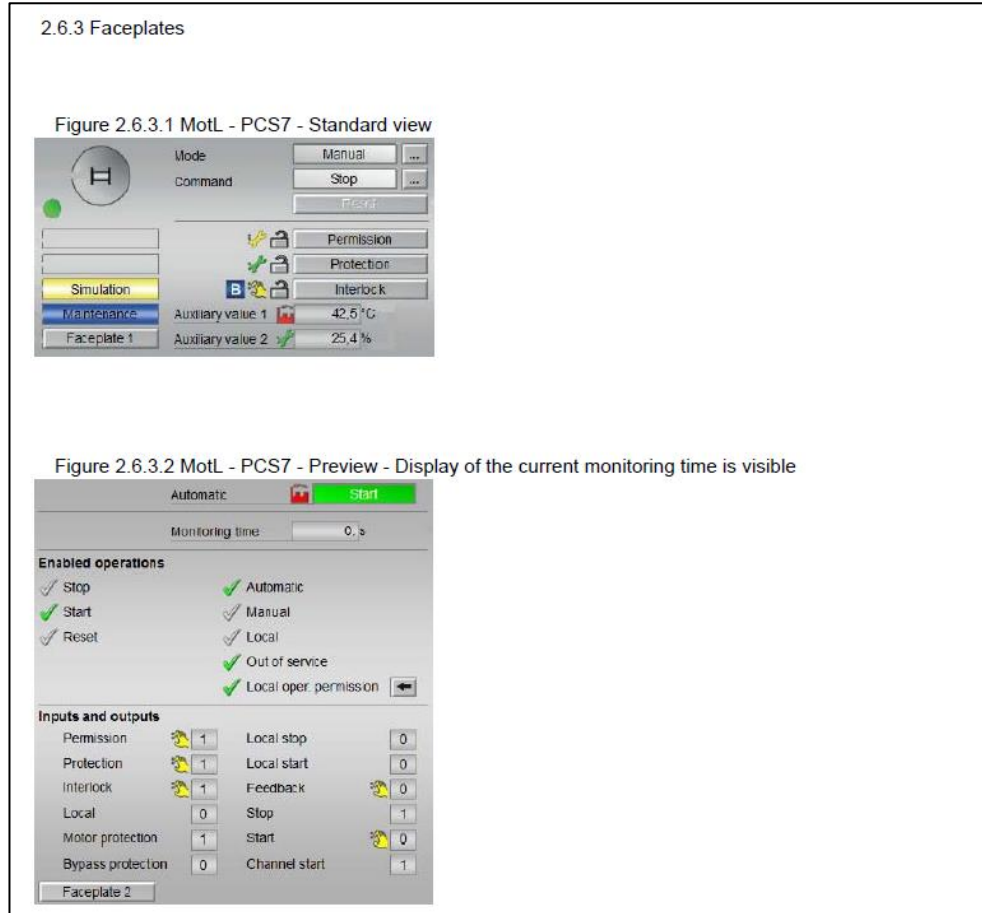
Figure 3-15



Faceplates

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

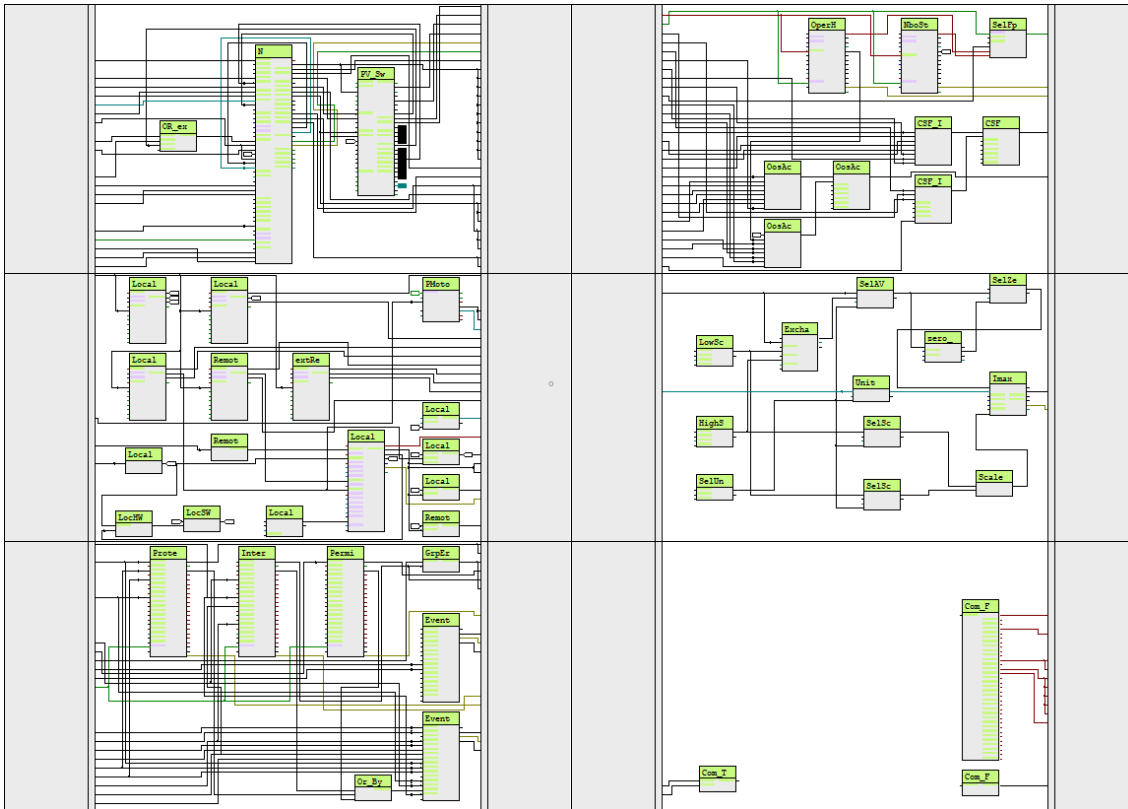
Figure 3-16



3.3 CFCs charts

As an extension of the profile, the CFC chart is shown with all blocks and I/Os.

Figure 3-17 "WCMT_MotLean_FbMMS03 " – CFC overview



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NOTE

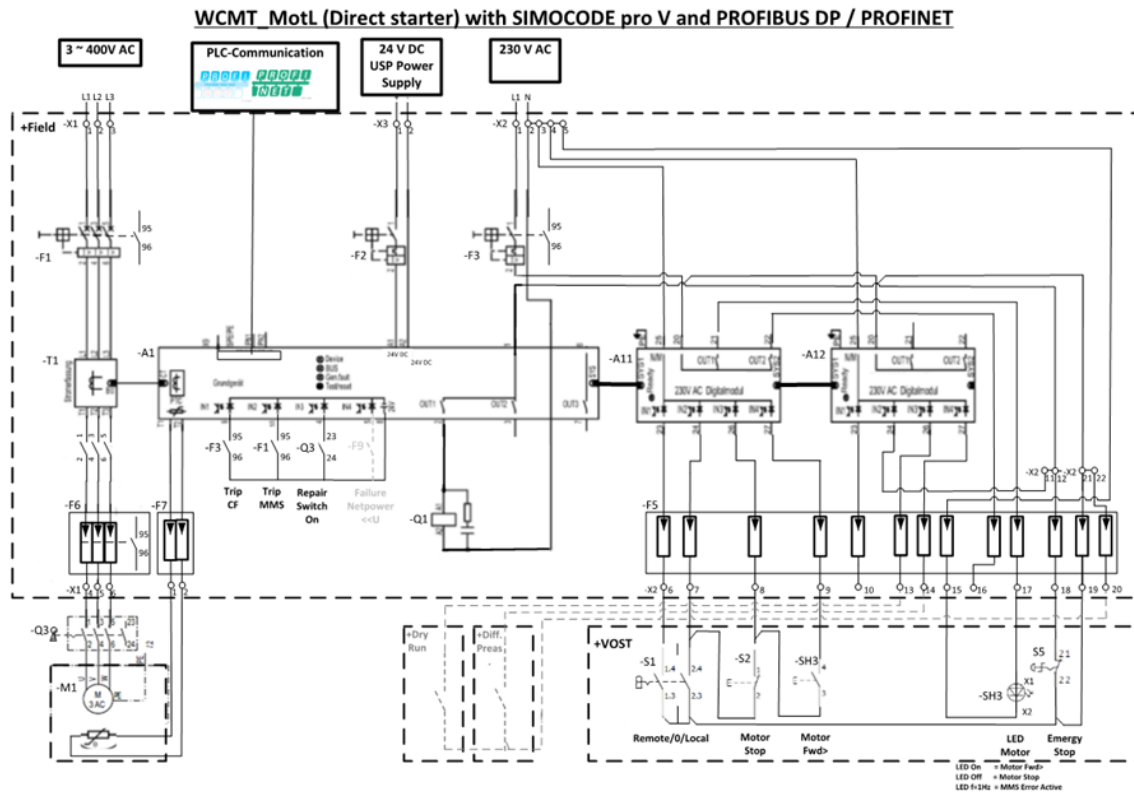
All associated individual plans are shown in the S7_WCMT profile following the CFC overview.

3.4 Circuit diagrams

Various electrical connection diagrams are available for the SIMOCODE pro V motor management system and for general-purpose drives. Your regional Siemens sales partner will provide you with the circuit diagrams at no charge.

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

Figure 3-18



4 Installation instructions

4.1 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 licensed ES software packages for Industry Library, TIA Portal, SITOP Library, PowerControl Library, SITRANS Library and SIMOCODE ES (TIA Portal) 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 4-1

Name	Version	Release	Status
WinCC Advanced Process Control	V7.5 SP2 Upd11	V07.05.20.11_01.04.00.04	K7.5.2.11
CFC	V9.0 SP7 Upd2	09.00.07.02_01.12.00.04	K9.0.7.2
PCS 7 Plant Automation Accelerator DataBase	V3.2	V03.02.00.00_00.00.00.00	K3.2.0.0
IEAPO	V9.0 SP7 Upd2	09.00.07.02_01.12.00.04	K9.0.7.2
Automation License Manager	V6.0 SP9 Upd4	06.00.09.04_01.01.00.03	K6.0.9.4
PCS 7 PowerControl Faceplates	V9.1	09.01.00.00_09.01.00.02	K9.1.0.0
SIMATIC PCS 7 PID-Tuner	V8.0 SP1 Upd2	K08.00.01.02_01.03.00.02	K8.0.1.2
SIMATIC PCS 7 Basis Faceplates	V9.1 SP2	09.01.02.00_02.02.00.02	K9.1.2.0
SIMATIC PCS 7 Advanced Process Faceplates	V9.1 SP2	09.01.02.00_04.02.00.01	K9.1.2.0
SIMATIC PCS 7 Advanced Process Library	V9.1 SP2 Upd1	09.01.02.01_01.07.00.01	K9.1.2.1
SIMATIC PCS 7 Basis Library	V9.1 SP2 Upd1	09.01.02.01_02.03.00.02	K9.1.2.1
SIMATIC PCS 7 HSP	V9.1 SP2 Upd1	V09.01.02.01_16.01.00.01	V09.01.02.01
__SIMATIC PCS 7 EU__	V9.1 SP2	V09.01.02.00_11.01.00.08	---
SIMATIC PCS 7 Tools	V9.1 SP2	09.01.02.00_11.01.00.08	K9.1.2.0
PCS 7 PowerControl Library	V9.1	09.01.00.00_09.01.00.02	K9.1.0.0
PCS 7 PowerControl Profibus Driver	V9.1	09.01.00.00_09.01.00.02	K9.1.0.0
PCS 7 PowerControl Profinet Driver	V9.1	09.01.00.00_09.01.00.02	K9.1.0.0
S7-PLCSIM	V5.4 SP8	V05.04.08.01_01.24.00.01	K5.4.8.1
PCS 7 PowerControl	V9.1	09.01.00.00_09.01.00.02	K9.1.0.0
PCS 7 PowerControl Licenses	V9.1	09.01.00.00_09.01.00.02	V9.1.0.0
PCS 7 PowerControl Docs	V9.1	09.01.00.00_09.01.00.02	K9.1.0.0
PUD Manager Help Viewer	V2.1 SP1 Upd1	V02.01.01.01_01.00.00.08	K2.1.1.1
PV InsInfo-Server	V9.0 SP7	09.00.07.00_01.39.00.02	K9.0.7.0
SIMATIC Remote Publisher	V7.5 SP2 Upd11	V07.05.20.11_01.04.00.04	K7.5.2.11
AS-OS-Engineering	V9.0 SP7 Upd2	09.00.07.02_01.12.00.04	K9.0.7.2

4 Installation instructions

Name	Version	Release	Status
SIMATIC S7-SCL	V5.7 HF1	K5.7.0.1_3.1.0.1	K5.7.0.1
SIMATIC SFC	V9.0 SP7 Upd2	09.00.07.02_01.12.00.04	K9.0.7.2
SIMATIC SFC Visualization(SFV)	V9.0 SP7 Upd1	09.00.07.01_01.12.00.03	K9.0.7.1
SIMATIC IL PCS 7 Faceplates for PCS7 OS	V9.1	09.01.00.00_03.04.00.01	V9.1.0.0
SIMATIC IL PCS 7 Function Blocks as addition for APL	V9.1	09.01.00.00_03.04.00.01	V9.1.0.0
SIMATIC NET PC Software	V16 Upd6	16.00.00.06_51.91.00.03	16.0.0.6
SL V13.0 Upd1: PCS 7 Faceplates for PCS7 OS	V13.0 Upd1	13.00.00.01_01.00.00.09	V13.0.0.1
SL V13.0 Upd1: PCS 7 Function Blocks	V13.0 Upd1	13.00.00.01_01.00.00.09	V13.0.0.1
SL V13.0 Upd1: PCS 7 Drivers	V13.0 Upd1	13.00.00.01_01.00.00.09	V13.0.0.1
SIMATIC Management Agent	V9.1 SP1 Upd2	09.01.01.02_08.00.00.05	K9.1.1.2
SIMATIC NET PC Software Doc	V16.0	V16.00.00.00_51.83.00.03	V16.0.0.0
SITOP Library V3.7	V3.7 SP1	V03.07.01.00_01.00.00.01	K3.7.1.0
STEP 7	V5.7 SP1	K5.7.1.0_11.1.0.1	K5.7.1.0
TH	V9.0 SP7 Upd2	09.00.07.02_01.12.00.04	K9.0.7.2
Version Cross Manager (VXM)	V9.0 SP7 Upd2	09.00.07.02_01.12.00.04	K9.0.7.2
WinCC Runtime	V7.5 SP2 Upd11	V07.05.20.11_01.04.00.04	K7.5.2.11
WinCC Configuration	V7.5 SP2 Upd11	V07.05.20.11_01.04.00.04	K7.5.2.11
WinCC OPC Server	V3.9 SP11 Upd4	03.09.11.04_01.01.00.02	K3.9.11.4
WinCC OPC-UA Client	V1.1 SP2 Upd4	01.01.02.04_01.02.00.01	K1.1.2.4
SIMATIC WinCC Smart Tools	V7.5 SP2	V07.05.20.00_01.58.00.03	K7.5.2.0
XML TRANSFER	V9.0 SP7 Upd2	09.00.07.02_01.12.00.04	K9.0.7.2

4.2 Retrieving in SIMATIC Manager

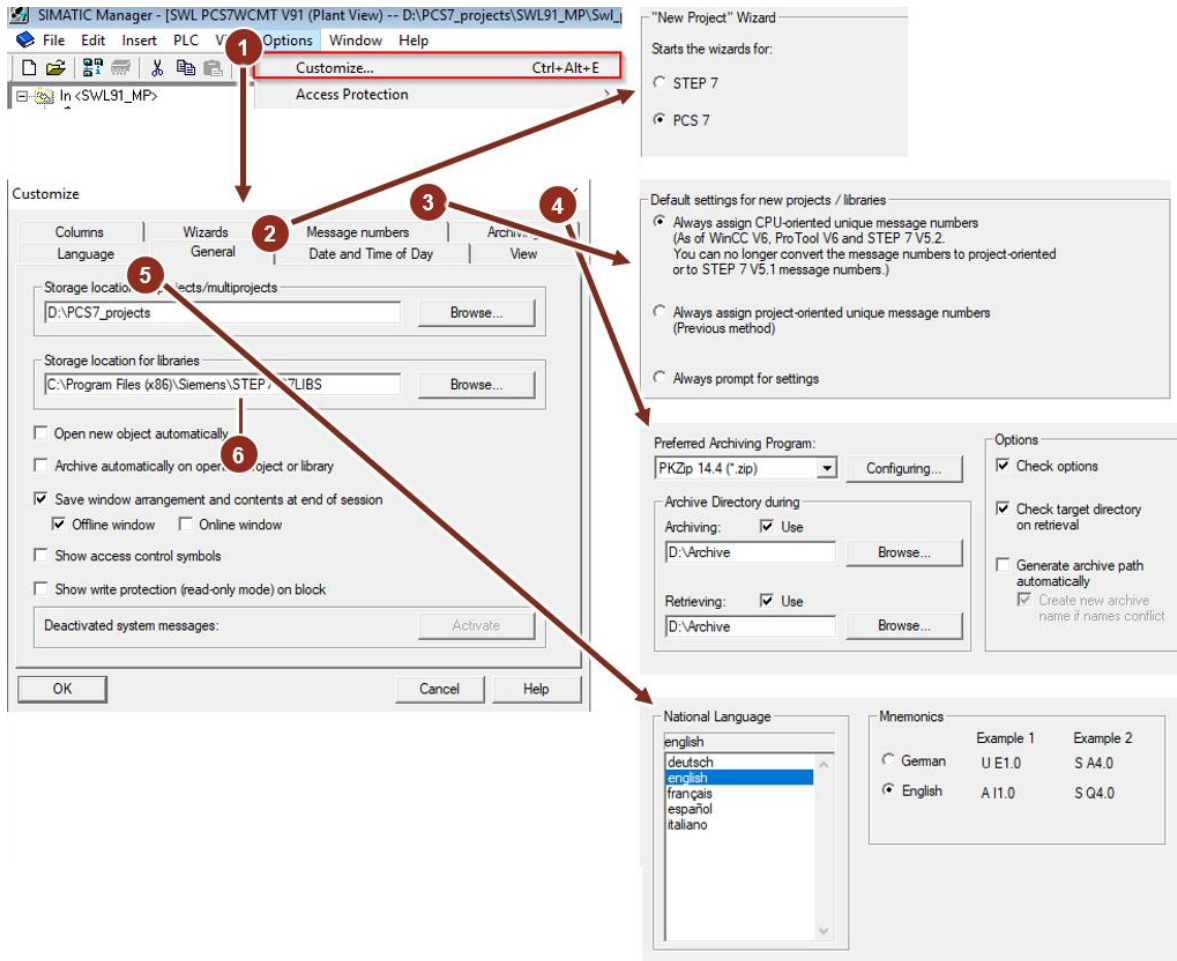
The libraries of the PCS 7 Water Templates from this application example can be obtained from your regional contact.

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

Dearchive the libraries with the standard function "Retrieve" in SIMATIC Manager.

Make sure you read the Project settings below:

Figure 4-1



- (1) Open the SIMATIC Manager Project settings
- (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 display.
- (6) Storage location of the PCS 7 Water Templates with the name "Swl_Adv912UC01_Lib" is stored by default in 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, SIMATIC Manager must be closed and restarted.

5 Appendix

5.1 Glossary

Table 5-1

Begriff	Erläuterung
AdvES	Advanced Engineering System
APL	Advanced Process Library (Control module type library) The PCS 7 AP Library V9.1 SP2 basically contains all blocks and functionalities of the PCS 7 Library V9.1 SP2 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 an integrated range of products and systems for efficient automation of plants in the water industry – regardless of whether it is a plant in the field of water, wastewater, irrigation or desalination.
TIA Portal	TIA Portal is an automation framework for the SIMATIC S7-1200, S7-300, S7-400 and S7-1500 CPU families from SIEMENS. The TIA Portal combines all the necessary software tools under one user interface. Innovative simulation tools, seamlessly integrated engineering and transparent plant operation are perfectly intertwined. TIA Portal makes it possible to have your project created efficiently using software generators. This reduces redundant workflows.
TIP	Totally Integrated Power™ stands for end-to-end electrical power distribution systems for infrastructure, buildings and industry.
Basis Library	Since the PCS 7 Library V9.1 SP2 and the PCS 7 AP Library V9.1 SP2 can be installed either individually or together, the blocks required together have been outsourced to the PCS 7 Basic Library V9.1 SP2. This mainly includes the driver modules.
CFC	Continuous Function Chart A high-level graphical language with function blocks for the configuration of continuous control systems.
Chart	The document in which the automation functions can be created using the CFC editor or the SFC editor.
CSV	Comma Separated Values ASCII text format for storing tabular data.
Faceplate	Standard operating screen A graphical element on the operator station screen that represents, for example, an analog control instrument, a hardwired push button, or a switch, that allows the operator to monitor and control the device.
Function Block	A control module as defined in IEC 1131-3.
Instance	A copy of a function block that is reused for the control configuration of a similar application.
Communication connection	The hardware and software for transmitting and receiving analog and digital information through a communication system such as a bus.
Module	A group of interconnected components that represent a recognizable device, instrument, or piece of equipment. An assembly can be shut down, removed as a complete unit and replaced with a spare part. It has definable performance characteristics that allow it to be tested as a unit.
Mode/Operating mode	Operating status of control modules such as manual, automatic or cascade.

Begriff	Erläuterung
Operator Station (OS)	Electronic equipment on which the human-machine interface is located, which includes at least one monitor, one keyboard and one pointing device, and is used by an operator to monitor and control the process or manufacturing units assigned to him.
PROFIBUS (Process Field Bus)	Fieldbus according to EN 50170 Vol. 2 PROFIBUS (DIN 19245; Bus system for industrial applications based on PROFIBUS).
Plug and Play	The ability of hardware devices to automatically identify themselves to the system. When the device is switched on, it is automatically assigned a unique identifier without the need to set DIP switches.
Process object (PO)	A collection of variables and parameters that performs a control function (e.g., motor, shut-off valve, PID controller) that can consist of more than one I/O point.
Protocols	Output of information in a standardized presentation; e.g. as a printout, screen display or file.
Redundant	A system/subsystem with two modules that perform automatic switching (equivalent circuit) when a fault occurs without failure of the system function.
Regulatory Control	The functions of process measurement, execution of control algorithms and control of a device actuator, which provide the automatic control of a plant process.
Safety	System access control by key lock, password, electronic card or equivalent.
SFC	Sequential Function Chart A high-level graphical configuration language for control sequence applications.
PLC	Programmable Logic Controller Used for discrete and continuous control in processing and production 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 variable, a measured input, a calculated value, or a combination thereof, as well as all associated control and output algorithms. Every tag is unique.
Tag ID	The unique alphanumeric code assigned to inputs, outputs, device locations, and control devices. The tag ID can include the asset area identifier.
Terminal bus	The network for communication between HMI clients and HMI servers.
Availability	The probability that a system will be able to perform its intended function when required.
Reliability	The probability that the system or component will fulfill its intended purpose for a certain period of time, usually measured as "Mean Time Between Failures".

5.2 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:

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:

siemens.com/SupportRequest

SITRAIN – Digital Industry Academy

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:

siemens.com/sitrain

Service offer

Our range of services includes the following:

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

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

support.industry.siemens.com/cs/sc

Industry Online Support app

You will receive optimum support wherever you are with the "Siemens Industry Online Support" app. The app is available for iOS and Android:

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

5.3 Industry Mall



The Siemens Industry Mall is the platform on which the entire Siemens Industry product portfolio is accessible. From the selection of products to the order and the delivery tracking, the Industry Mall enables the complete purchasing processing – directly and independently of time and location:

mall.industry.siemens.com

5.4 Links and literature

Table 5-2

Nr.	Thema
\1\	Siemens Industry Online Support https://support.industry.siemens.com
\2\	Link to this entry page of this application example https://support.industry.siemens.com/cs/ww/en/view/78604785
\3\	SIMATIC PCS 7 V9.1 – Room for new perspectives https://support.industry.siemens.com/cs/de/en/view/63481413
\4\	SIMATIC PCS 7 technical documentation https://support.industry.siemens.com/cs/ww/en/view/109801081
\5\	SIMATIC PCS 7 Online Support (Overview) https://support.industry.siemens.com/cs/ww/en/view/63481413
\6\	Licenses and configuration limits V9.1 https://support.industry.siemens.com/cs/ww/en/view/109794371
\7\	Concept & Design Tool for the design of the process control system architecture https://support.industry.siemens.com/cs/de/en/view/109802553
\8\	SIMATIC Process Control System PCS 7 Advanced Process Library Readme V9.1 SP2 Upd1 (online) https://support.industry.siemens.com/cs/de/en/view/109815527
\9\	SIMATIC PCS 7 V9.1 SP2 Software Updates https://support.industry.siemens.com/cs/ww/en/view/109812242
\10\	Sales and Delivery Release: SIMATIC PCS 7 Industry Library V9.1 https://support.industry.siemens.com/cs/ww/en/view/109805501
\11\	SIMATIC PCS 7 Industry Library V9.1 manual https://support.industry.siemens.com/cs/de/en/view/109805917
\12\	SIMATIC PCS 7 Condition Monitoring Library V9.0 https://support.industry.siemens.com/cs/en/de/view/109751047
\13\	Product documentation SIMATIC PCS 7 TeleControl V9.1 https://support.industry.siemens.com/cs/ww/en/view/109808769
\14\	Integrated engineering based on COMOS with SIMATIC PCS 7 and SIMIT simulation https://support.industry.siemens.com/cs/ww/en/view/56731718

Nr.	Thema
\15\	SITRANS Library https://new.siemens.com/global/en/products/automation/process-instrumentation/communication-and-software.html
\16\	Configuration of Frequency Converters with the APL Channel Block "FbDrive" in SIMATIC PCS 7 https://support.industry.siemens.com/cs/ww/en/view/64181993
\17\	Configuration 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\	SITRANS FM MAG 5000/6000 IP67 https://support.industry.siemens.com/cs/ww/en/view/109810683
\20\	Configuration of SINAMICS and MICROMASTER drives with Drive ES in PCS 7 https://support.industry.siemens.com/cs/ww/en/view/58007228
\21\	All-round protection with Industrial Security - Plant Security https://support.industry.siemens.com/cs/ww/en/view/50203404
\22\	Application Description for 3-way control via SIMOCODE [Resource only available in German] https://support.industry.siemens.com/cs/ww/de/view/61026729
\23\	Templates for specification of technical functions with SFC Types in SIMATIC PCS 7 https://support.industry.siemens.com/cs/ww/en/view/33412955
\24\	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
\25\	Software for integration of the SITRANS product family in SIMATIC https://support.industry.siemens.com/cs/ww/en/view/65741624
\26\	System libraries http://w3.siemens.com/mcms/process-control-systems/en/simatic-pcs-7/simatic-pcs-7-systemkomponenten/Systembibliotheken/Pages/Systembibliotheken.aspx
\27\	PROFIBUS PA/DP Communication Modules Operating Instructions https://support.industry.siemens.com/cs/ww/en/view/109739262
\28\	Automating with STEP 7 in AWL and SCL Author: Hans Berger Publicis MCD Publisher ISBN: 978-3-89578-397-5
\29\	Process Control System Engineering Author: Leon Urbas Oldenburg Industrial publishing house ISBN: 978-3-8356-3198-4

5.5 Change documentation

Table 5-3

Version	Date	Modifications
V1.0	11/2017	First edition
V2.0	10/2018	Update to SIMATIC PCS 7 V9.0 SP1
V3.0	05/2020	Update to SIMATIC PCS 7 V9.0 SP2
V4.0	06/2022	Update to SIMATIC PCS 7 V9.1
V5.0	09/2022	Update to SIMATIC PCS 7 V9.1 SP1 UC01
V6.0	04/2023	Update to SIMATIC PCS 7 V9.1 SP2 UC01