



SIMATIC

Process Control System PCS 7 PCS 7 Advanced Process Library Readme V9.0 SP3 (Online)

Readme

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Version: 2019-08-07 (online)

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This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

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indicates that death or severe personal injury **will** result if proper precautions are not taken.

WARNING

indicates that death or severe personal injury **may** result if proper precautions are not taken.

CAUTION

indicates that minor personal injury can result if proper precautions are not taken.

NOTICE

indicates that property damage can result if proper precautions are not taken.

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The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

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We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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Security information

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

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

Overview

Note

Read these notes carefully; they contain information that will be important to you and upgrades to PCS 7 Advanced Process Library.

The information given in this Readme file takes precedence over all the PCS 7 manuals.

Notes on installation

3.1 Scope of delivery

The scope of delivery includes the following library:

- PCS 7 Advanced Process Library V9.0 SP1

3.2 Hardware requirements

The installation is subject to the conditions of SIMATIC PCS 7 V9.0 SP1.

3.3 Software requirements

- At least SIMATIC PCS 7 V9.0 SP1
- At least PCS 7 Basis Library V9.0 SP1 Update 2.

NOTICE
If the PCS 7 Basis Library is not upgraded simultaneously to at least version 9.0 SP1 Update 2, the channel blocks of the PCS 7 Advanced Process Library will no longer function properly.

NOTICE
Use a SENTRON communication-capable 3VA molded case circuit breaker on PROFINET in your project, you must use at least PCS 7 Basis Library V9.0 SP1 Update 5. Otherwise, the generating of module drivers will be canceled with an error.

3.4 Installing the PCS 7 Advanced Process Library

Exit all applications before you start setup.

Install the library via the PCS 7 master setup or start the program Setup.exe of the PCS 7 Advanced Process Library. You will receive all further information during the installation process.

3.4 Installing the PCS 7 Advanced Process Library

The library is copied to the same drive on which the PCS 7 basic software is installed. Installation requires about 1.6 MB of free memory on the hard disk.

Following the installation, you can find the blocks of the PCS 7 Advanced Process Library and templates under "PCS 7 AP Library V9.0".

Practical examples are located in the "APL_Example_EU" example project.

In order to receive the delta compilation and delta load capability in your project, use the blocks from the previous version of the PCS 7 Advanced Process Library.

To update your AS project, copy the blocks to your project. Then perform a block type import.

Please note that in this case you can not use the new features and improvements described in the section "New features and changes compared to earlier versions".

New features and changes as compared to previous versions

4

Note

For possible behavior changes in earlier versions, please refer to the readme of the previous version.

4.1 Version 9.0

4.1.1 What's New in Version 9.0?

- The **MeanTime** block can be configured so that analog input values with a bad status are ignored when generating the mean value.
- The rapid stop is now also displayed at the block icon for the motors **MotL**, **MotRevL**, **MotSpdCL**, **MotSpdL**, **VlvMotL** and **VlvPosL**.
- The "Forcing operating states" function can also be used in local mode for the following blocks: **MotL**, **MotRevL**, **MotSpdCL**, **MotSpdL**, **VlvL**, **Vlv2WayL**, **VlvMotL**, **VlvPosL** and **DoseL**.
- The ramp or gradient limiting function at the **RateLim** block can be stopped.
- The prediction horizon is displayed in the preview for the model-based predictive control, **ModPreCon**.
- For the model-based predictive control, **MPC10x10**, the target values of the operating point optimization are displayed in the standard view.
- The process tag type **PIDCoR_MV_Ramp** "PIDConR with safety logic and manipulated variable gradient limit" was created For the **PIDConR** controller block.
- The new **StrctDeC** block resolves a 32-bit structure into individual bit outputs or combines them into a DWORD output. It is called by the **GainSched** block and used in the **FbGainSchedLim** CFC, which is, in turn, included in the process tag type **GainScheduling** "PID control with operating-point dependent parameter control".
- The new **KalFilt** block contains the algorithm of an extended Kalman filter and calculates internal state variables of non-linear dynamic systems. The system variables are determined with the help of a configurator.
- The status of the inputs for automatic addressing, such as StartAut, StopAut, OpenAut, CloseAut, etc., can also be evaluated at the following blocks: **MotL**, **MotS**, **MotRevL**, **MotSpdCL**, **MotSpdL**, **VlvL**, **VlvS**, **VlvMotL**, **VlvAnL**, **VlvPosL**, **Vlv2WayL**, **DoseL**, **OpAnL**, **OpAnS**, **OpDi01**, **OpDi03**, **OpTrig**

4.1 Version 9.0

- The information of the first-in detection at the FirstIn output of the interlock blocks can be analyzed using the new **FirstIn** block, and messages can be generated using the inputs for freely selectable ExtMsgx and ExtVax messages at the technological blocks or at the **EventTs** and **Event16Ts** message blocks.
- The blocks **MonAnL**, **MonDiL**, **PIDConL**, **PIDConR**, **PIDStepL** and **TotalL** can be set to bypass mode. Switch on/off can be locked by means of a separate input. Optionally, a bypass value can be assigned to the output. An interlock input can be actively bypassed using an interconnection between the BypassAct output and the BypLix input at one of the interlock blocks **Intlk02**, **Intlk04**, **Intlk08**, **Intlk16**.
- Optionally, pulse control can be disabled at the following blocks with local mode Localsetting 2/4: **MotL**, **MotRevL**, **MotSpdCL**, **MotSpdL**, **VlvL**, **VlvMotL**, **VlvPosL**, **Vlv2WayL**
- The **TimerP** block has a holding function that can be controlled using a separate hold input.
- An optional configuration is available for **VlvMotL** so that the Open or Close motor controls can be reset even if only the corresponding valve feedback is true. In the default state, however, both valve feedbacks must be true for the motor control to be revoked.
- The channel blocks **Pcs7DiIn**, **Pcs7DiOu**, **Pcs7DiIT**, **Pcs7AnIn**, **Pcs7AnOu**, **FbAnOu**, **FbAnIn** support the IO redundancy of the ET200SP HA.

The following points are already included in APL 8.2 SP2:

- Ramp operation is possible at the **PIDConL**, **PIDConR**, **PIDStepL**, **MotSpdCL** and **OpAnL** blocks via an external setpoint or at **VlvAnL** using the external manipulated variable. The gradient limit was expanded to the default through the ramp time for this. The time until the target setpoint or the target manipulated variable is reached has been made available at the output and is displayed in the preview.
- Two delay times are now available at the **PIDConL** and **PIDConR** blocks to monitor actual value and control deviation for each individual limit.
- The limits for monitoring the actual value as well as the block outputs are now available at the **PIDConL** and **PIDConR** blocks.
- The first analog input can be controlled by the operator at the **SelA16In** block.
- The setpoint can also be controlled by the operator in local mode at the **MotSpdCL** block.
- A separate setpoint can be specified for the disabled motor in the CFC at the **MotSpdCL** block. The setpoint low limit is restricted to this separate setpoint.
- Control in local mode can be set to switch or pushbutton operation at the blocks **MotL**, **MotRevL**, **MotSpdCL**, **MotSpdL**, **VlvL**, **Vlv2WayL**, **VlvMotL** and **VlvPosL**.
- The behavior of the device infeed at **MotSpdCL** can be adapted per Feature bit at the inverter enable.

4.1.2 Changes in version 9.0

- The **GainSched** block no longer contains the **OpDi01** block. Instead, the new **StrctDeC** block is called by **GainSched**. If necessary, copy the new **StrctDeC** block to the master data library.
- If not all Inx inputs are interconnected (Inx.ST = 16#FF) for the interlock blocks **Intlk02**, **Intlk04**, **Intlk08** and **Intlk16**, this state is forwarded to the Out output. Simulation is output as the worst signal status (ST_Worst = 16#60) in the faceplate.
- The default of the S7_enum attribute was adapted for the unit parameters at the blocks **FbAnIn**, **FbAnOu**, **FbAnTot**, **Pcs7AnIn**, **Pcs7AnOu**.
- The behavior of the **OpTrig** in reference to the worst signal status ST_Worst and the status of Out.ST was adapted to the behavior of the blocks **OpDi01** and **OpDi03**.
- The limit displays SP_HiAct, SP_LoAct were corrected for parameter assignment for SP_TrkExt = 0 in the **MotSpdCL** block.
- The target setpoint or, with **VlvAnL**, the target manipulated variable, the limited value is also written back to the input parameter for ramp operation at the blocks **PIDConL**, **PIDConR**, **PIDStepL**, **MotSpdCL**, **OpAnL**, **FmCont** and **FmTemp**.
- Attributes that are not required for OS compiling were removed at the **PIDConR**, **PIDStepL**, **FmCont** and **FmTemp** blocks.
- The calculation of the variance was optimized at the **ConPerMon** block. Please recalibrate the limits for the CPI value.
- The default of the NumberMV parameter was changed at the **ModPreCon** block.
- Local tags that were not required were deleted at the **ShrdResL** and **ShrdResS** blocks.

The following point is already included in APL 8.2 SP2:

- At the **MotSpdCL** block, the function "Gear reduction or setpoint adjustment with factor" has been adapted in the event that the external setpoint is outside or directly at the setpoint limits.

4.1.3 Update information for version 9.0

The following applies to the software update from V8.2 SP2 to version 9.0:

1.	Make Textual Inter-connections	Yes
2.	Compile AS	Complete compilation
3.	Download AS program	Complete download
4.	AS STOP necessary	Yes (AS STOP is not necessary if a CPU 410-5H with TCiR is used)
5.	Compile OS	Complete compilation

Note

Updating the blocks from the PCS 7 Advanced Process Library with TCiR

"Type import - Changed default value" dialog box

- If information on changed internal local default values in the static area is displayed during type import in the dialog box, these changes are not relevant. A complete download in STOP mode is not necessary.
- If information on changed default values is displayed at block I/Os during type import in the dialog box, these new default values must be applied in the "Update Block Types" dialog.

List of changed blocks

Name	Number	Block version	Interface change (AS STOP is not necessary if a CPU 410-5H with TCiR is used)	Code change
CntOhSc	FB1803	5.0	Yes	No
ConPerMon	FB1805	5.0	Yes	Yes
DoseL	FB1809	5.0	Yes	Yes
Event16Ts	FB1887	5.0	Yes	Yes
EventTs	FB1812	5.0	Yes	Yes
FbAnIn	FB1813	9.0	Yes	Yes
FbAnOu	FB1814	9.0	Yes	Yes
FbAnTot	FB1817	9.0	Yes	Yes
FmCont	FB1818	9.0	No	Yes
FmTemp	FB1819	9.0	No	Yes
GainSched	FB1820	5.0	Yes	Yes
Intlk02	FB1824	5.0	Yes	Yes
Intlk04	FB1825	5.0	Yes	Yes
Intlk08	FB1826	5.0	Yes	Yes
Intlk16	FB1827	5.0	Yes	Yes
MeanTime	FB1832	5.0	Yes	Yes
ModPreCon	FB1843	5.0	Yes	No
MPC10x10	FB1920	5.0	Yes	Yes
MonAnL	FB1845	5.0	Yes	Yes
MonDiL	FB1848	5.0	Yes	Yes
MotL	FB1850	5.0	Yes	Yes
MotRevL	FB1851	5.0	Yes	Yes
MotS	FB1910	5.0	Yes	Yes
MotSpdCL	FB1854	5.0	Yes	Yes
MotSpdL	FB1856	5.0	Yes	Yes
OpAnL	FB1865	5.0	Yes	Yes

OpAnS	FB1915	5.0	Yes	Yes
OpDi01	FB1866	5.0	Yes	Yes
OpDi03	FB1867	5.0	Yes	Yes
OpStations	FB1901	5.0	Yes	No
OpTrig	FB1868	5.0	Yes	Yes
Pcs7AnIn	FB1869	9.0	Yes	Yes
Pcs7AnOu	FB1870	9.0	Yes	Yes
Pcs7DiIn	FB1871	9.0	Yes	Yes
Pcs7DiIT	FB1872	9.0	Yes	Yes
Pcs7DiOu	FB1873	9.0	Yes	Yes
PIDConL	FB1874	5.0	Yes	Yes
PIDConR	FB1875	5.0	Yes	Yes
PIDStepL	FB1878	5.0	Yes	Yes
RateLim	FB1882	5.0	Yes	Yes
Ratio	FB1883	5.0	Yes	No
SelA16In	FB1888	5.0	Yes	Yes
ShrdResL	FB1917	5.0	No	Yes
ShrdResS	FB1914	5.0	No	Yes
TimerP	FB1810	5.0	Yes	Yes
TotalL	FB1906	5.0	Yes	Yes
Vlv2WayL	FB1897	5.0	Yes	Yes
VlvAnL	FB1896	5.0	Yes	Yes
VlvL	FB1899	5.0	Yes	Yes
VlvMotL	FB1900	5.0	Yes	Yes
VlvPosL	FB1918	5.0	Yes	Yes
VlvS	FB1911	5.0	Yes	Yes

Note

- Blocks for which only attributes, message texts, and/or version number were changed, are not listed.
- If "Yes" is listed in the column "Interface change" and "No" in the column "Code change", the interfaces were prepared for a future function.

4.2 Version 9.0 Update 1

4.2.1 Changes in version 9.0 Update 1

- For the **Intlk02**, **Intlk04**, **Intlk08** and **Intlk16** interlock blocks, a set input NotUsed =1 no longer has any influence on the status of the Out.ST output. The block thus behaves in the same way again as in versions earlier than V9.0.

4.2.2 Update information for version 9.0 Update 1

The following applies to the software update from V9.0 to Version 9.0 Update 1:

1.	Compile AS	Compile changes
2.	Download AS program	Download changes
3.	AS STOP necessary	No
4.	Compile OS	Not necessary

List of changed blocks

Name	Number	Block version	Interface change (AS stop necessary)	Code change
Intlk02	FB1824	5.0	No	Yes
Intlk04	FB1825	5.0	No	Yes
Intlk08	FB1826	5.0	No	Yes
Intlk16	FB1827	5.0	No	Yes

Note

The comment [Release 09.00.00.01] has been inserted in all changed blocks.

4.3 Version 9.0 SP1

4.3.1 What's new in Version 9.0 SP1?

- At the **PIDConR** block, the controller parameters TI and TD can now also be entered in minutes and seconds via the inputs TI_Unit and TD_Unit .
- With the **Integral** block, the calculation of the output status can be influenced for each feature bit. If Feature bit =1, the output status corresponds to the input status Out.ST = In.ST.
- With the **DoseL** block, the start-up behavior of scale dosing can be influenced for each feature bit. If feature bit =1, scale dosing can only be started if the input parameter StandStill is set, i.e. the scale is at a standstill.
- The parameters for gradient and ramp operation at the **MotSpdCL**, **OpAnL**, **PIDConL**, **PIDConR**, **PIDStepL**, **VlvAnL** blocks can now be defined via the interconnectable parameters SP/MV_LiUpRaLim, SP/MV_LiDnRaLim and SP/MV_LiRmpTime .
- The **KalFilt** block now also features local operator authorization.

- On the **MonAnL** block, the 9th associated value for the message instances **MsgEvld1**, **MsgEvld2** is assigned the input process value **PV**.
- At the channel blocks **PCS7AnIn**, **PCS7AnOu**, **PCS7Cnt1**, **PCS7DiIn**, **PCS7DiOu**, the default setting of the attributes **S7_m_c** = false and **S7_xm_x** = "Value.false" has been inserted at the process values **PV_Out**, **PV_in**, **PV1_Li**, **PV2_Li**. This simplifies the later activation of these attributes via AWL. This does not cause the code to be changed.
- The bypass functionality has been extended. If input signals of the interlock blocks **Intlk02**, **Intlk04**, **Intlk08**, **Intlk16** with limit switch points are interconnected with bypass information, the input signal can be bridged using this bypass information if bypass enable bits is set. The bypass function can be reset at all interlock inputs via the interconnectable input **RstByPLi**. Process outputs and the limit switch points of the **MonAnL**, **MonDiL**, **TotalL**, **PIDConL**, **PIDConR** and **PIDStepL** blocks were provided with a bypass information bit. If the bypass function is activated at the blocks, then the bypass information bits of these outputs are also set.
- The **AssetM** block has been extended so that it can also be used to display information without **EDD**.
- The following blocks have been given batch displays with corresponding input parameters: **CntOhSc**, **Intlk02**, **Intlk04**, **Intlk08**, **Intlk16**, **OpStations**, **OpDi01**, **OpDi03**, **OpTrig**, **Ratio** and **SelA16In**.
- A separate interlock is available for each direction at **VlvMotL** and **VlvPosL** by means of the new Feature2 Bit 16.
- By means of the new Feature, Feature2 Bit 11 at the **DoseL**, **FmCont**, **FmTemp**, **PIDConL**, **PIDConR**, **PIDStepL**, **MonDi08**, **MonAnL**, **MonDiL**, **MotL**, **MotSpdCL**, **MotRevL**, **MotSpdL**, **VlvL**, **VlvMotL**, **Vlv2WayL**, **VlvAnL**, **VlvPosL** blocks, the transmission of the **MsgLock** function and operating mode "Out of service" to the interconnected message block (**EventTs**, **Event16Ts**) can be suppressed. This only applies to the interconnection at the input **EventTsIn**.
- Via Feature Bit8 the variance and therefore the **CPI** value can be calculated in a more accurate yet more CPU-intensive manner at the **ConPerMon** block. If the calculation type is changed, the limit values **CPI_AL_Lim** and **CPI_WL_Lim** may have to be adapted.
- In preparation for future versions of PCS 7, the channel block **Pcs7AnIn** supports the scalable measuring range of the module ET 200SP AI 4xRTD/TC 2-/3-/4-wire HF (6ES7134-6JD00-0CA1) V2.0 for the measuring type thermocouple with measuring range type K [NiCr-NiAl]. On selection of the option scalable measuring range in HW Config, on compilation with module drivers, the values for Minimum and Maximum from HW Config are parameterized at the input parameters **Scale** of the channel block **Pcs7AnIn**. If the option Scalable measuring range is reset, then please assign parameters to the values for the input parameter **Scale** in accordance with your requirements (default values Low=0 and High=100).

4.3.2 Changes to Version 9.0 SP1

- At blocks **MotL**, **MotRevL**, **MotSpdCL**, **VivMotL**, **VivL**, **VivAnL** and **VivPosL**, the static monitoring of feedback messages is now also active during processing of warning times for controls.
- The behavior of the **Smooth** block in the event of excessively large time constants has been improved. If time constants are too large, the `ErrorNum = 62` output is set.
- The status calculation in the **FbAnIn** block at the `PV_Li.ST` output has been improved.
- The activation of laboratory sampling at the **KalFilt** block has been improved.
- The attributes `S7_m_c`; `s7_alarm_ui` have been optimized internally at the **Polygon**, **FbDrive**, **FbSwMMS**, **FbEnMe**, **ShrdResS**, **ShResL**, **STRep**, **CntOhSc**, **FbAnTot** blocks.
- At the **Lag** block, the update of the time response of the filter function after a shift to a different cyclic interrupt level has been improved.
- The function "Two delay times for each limit value" with the system deviation ER has been improved at the **PIDConL** and **PIDConR** blocks.
- The parameter comments at the **Snd_DigVa**, **Snd_AnaVal**, **Rcv_DigVal** and **Rcv_AnaVal** blocks have been revised.
- The **Pcs7HaAI** and **Pcs7HaAO** blocks now respond to additional quality codes of the HART modules with `HV_OutXBad.Value = 1` (see online help).
- At the **TimeTrig** block, the calculation of `OSPermOut` and `OSPermLog` in relation to the display of the operator control enable of periodic mode (parameter view) has been improved.
- At the **TimeTrig** block, the start of the individual trigger via interconnection is only possible by an edge 0-1 at the input parameter `SetPerLi`.
- At the **VivAnL** block without auxiliary valve, the gradient limit of the manipulated variable has been improved in the areas `PosDiOpen.MV_HiLim` and `PosDiClose.MV_LoLim` in automatic mode with control via `OpenAut`, `CloseAut`.
- The `PV_Out` is now used as an associated value at the **MonAnL** blocks, and the `RbkOut` output is used for the **PIDConL**, **PIDConR**, **PIDStepL**, **FmCont**, **FmTemp** controllers.

4.3.3 Update Information for Version 9.0 SP1

The following applies to the software update from V9.0.x to version 9.0 SP1:

1.	Make Textual Inter-connections	No
2.	Compile AS	Compile changes
3.	Download AS program	Download changes
4.	AS STOP necessary	No
5.	Compile OS	Complete compilation

List of changed blocks

Name	Number	Block version	Interface change	Code change
CntOhSc	FB1803	5.1	No	No
DoseL	FB1809	5.1	No	Yes
FbAnIn	FB1813	9.1	No	Yes
FbAnTot	FB1817	9.1	No	No
FbDrive	FB1905	9.1	No	No
FbEnMe	FB1908	9.1	No	No
FbSwMMS	FB1907	9.1	No	No
Lag	FB1828	5.1	No	Yes
MotL	FB1850	5.1	No	Yes
MotRevL	FB1851	5.1	No	Yes
MotSpdCL	FB1854	5.1	No	Yes
MotSpdL	FB1856	5.1	No	Yes
Pcs7AnIn	FB1869	9.1	No	Yes
Pcs7AnOu	FB1870	9.1	No	Yes
Pcs7HaAl	FB1931	9.1	No	Yes
Pcs7HaAO	FB1932	9.1	No	Yes
PIDConR	FB1875	5.1	No	Yes
Polygon	FB1881	5.1	No	No
ShrdResS	FB1914	5.1	No	No
ShrdResL	FB1917	5.1	No	No
Smooth	FB1890	5.1	No	Yes
STRep	FB1801	5.1	No	No
Vlv2WayL	FB1897	5.1	No	Yes
VlvAnL	FB1896	5.1	No	Yes
VlvL	FB1899	5.1	No	Yes
VlvMotL	FB1900	5.1	No	Yes
VlvPosL	FB1918	5.1	No	Yes

Note

- If "No" is listed in the column "Code change", only attributes, message texts and/or version number have been changed.

4.4 Version 9.0 SP1 Update 1

4.4.1 Changes in version 9.0 SP1 Update 1

- For the **Intlk02**, **Intlk04**, **Intlk08** and **Intlk16** interlock blocks, a set input NotUsed =1 no longer has any influence on the status of the Out.ST output. The block thus behaves in the same way again as in versions earlier than V9.0.

4.4.2 Update information for version 9.0 SP1 Update 1

The following applies to the software update from V9.0.1 to version 9.0.1 Update 1:

1.	Compile AS	Compile changes
2.	Download AS program	Download changes
3.	AS STOP necessary	No
4.	Compile OS	Not necessary

List of changed blocks

Name	Number	Block version	Interface change (AS stop necessary)	Code change
Intlk02	FB1824	5.1	No	Yes
Intlk04	FB1825	5.1	No	Yes
Intlk08	FB1826	5.1	No	Yes
Intlk16	FB1827	5.1	No	Yes

Note

The comment [Release 09.00.01.01] has been inserted in all changed blocks.

4.5 Version 9.0 SP1 Update 2

4.5.1 Changes in version 9.0 SP1 Update 2

- The readiness to switch on `RdyToStart` was corrected at the **VlvMotL** block. In the combination `MonSafePos = 0` and monitoring error, the readiness to switch on is now also set again.
- When using the analog input module 134-6JH00 with the Fahrenheit unit, the preset of the Mode parameter was changed. The correction for this was made in the `al_chn_apl.xml` file.
- For the blocks **FbDrive** and **FbSwitMMS**, a comment has been inserted at `Feature Bit 9`. This bit is evaluated by the driver wizard and decides whether the meta-knowledge and the diagnostic blocks of the PCS 7 Basis Library or an installed add-on library are used.
- Improvement of the **TCiR** behavior when upgrading from versions <9.0. The **channel blocks** evaluate the new first run identifier of the diagnostic modules from the PCS 7 Basis Library connected to the `DataXchg1` input.

NOTICE

Behavior change when not using the CFC function "Generate module driver" or using 3rd-Party diagnostic blocks.

Usually, the `DataXchg1` input of the channel blocks is automatically connected when the module drivers are generated. Users who do not use this function must configure the Feature Bit 27 "Do not evaluate first run identifier of the diagnostic blocks" with "1" at the respective channel blocks.

The Feature Bit 27 must also be set if 3rd-Party diagnostic blocks are used that do not provide a first run identifier.

4.5.2 Update Information for Version 9.0 SP1 Update 2

The following applies to the software update from V9.0.1 Update 1 to Update 2:

1.	Compile AS	Compile changes
2.	Download AS program	Download changes
3.	AS STOP necessary	No
4.	Compile OS	Not necessary

List of changed blocks

Name	Number	Block version	Interface change (AS stop necessary)	Code change
VlvMotL	FB1900	5.1	No	Yes

4.6 Version 9.0 SP2

FbAnIn	FB1813	9.1	No	Yes
FbAnOu	FB1814	9.1	No	Yes
FbAnTot	FB1817	9.1	No	Yes
FbDiIn	FB1815	9.1	No	Yes
FbDiOu	FB1816	9.1	No	Yes
FbDrive	FB1905	9.1	No	Yes
FbEnMe	FB1908	9.1	No	Yes
FbSwtMMS	FB1907	9.1	No	Yes
FmCont	FB1818	9.1	No	Yes
FmTemp	FB1819	9.1	No	Yes
Pcs7AnIn	FB1869	9.1	No	Yes
Pcs7AnOu	FB1870	9.1	No	Yes
Pcs7DiIn	FB1871	9.1	No	Yes
Pcs7DiIT	FB1872	9.1	No	Yes
Pcs7DiOu	FB1873	9.1	No	Yes
Pcs7Cnt1	FB1833	9.1	No	Yes
Pcs7Cnt2	FB1834	9.1	No	Yes
Pcs7Cnt3	FB1835	9.1	No	Yes

Note

The comment [Release 09.00.01.02] has been inserted in all changed blocks.

4.6 Version 9.0 SP2

4.6.1 What's new in Version 9.0 SP2?

- For the blocks **Rcv_DigVal** and **Rcv_AnaVal**, **Feature Bit 30** for hold last value was added. With **Feature Bit 30** =1 the last valid value and the associated signal status are held. A "bad" signal status (16#00 or 16#28) is thereby replaced and output through simulation (16#60). The current behavior is maintained for **Feature Bit 30** =0 (default): The last valid value with signal status 16#00 is output.
- The block **PowerXY** has been added for the calculation of a general power function.
- The block **SelA16L** has been added to select one of 16 analog values with extended functionality.

- A separate interlock is available for the Open and Closed valve positions for **VlvAnL** or the speeds 1 and 2 for **MotSpdL** by means of Feature2 Bit 16.
VlvAnL: When the valve position is reached (control = feedback), a control into the new valve position is prevented depending on the direction by means of the release interlock. With an active interlock or protective interlock, a control into the new valve position is prevented depending on the direction. With a control present in the interlocked direction, the valve is placed in the idle state SafePos if possible. With an interlock in the direction of Open or Closed idle state (SafePos = 1, Intlock/Protect = 0 or SafePos = 0, IntlRev/ProtRev = 0), the control is prevented.
MotSpdL: With a stopped motor, control of the motor is prevented depending on the speed by means of the release interlock.
With active interlock or protective interlock, the motor is stopped depending on the speed or a control of the motor is prevented depending on the speed.
- If the following blocks are switched to "Out of service" mode, depending on the Feature Bit, signal status of process signals such as feedback signal, control signal and limit stop signal is changed to status simulation (16#60):
MotL, MotS, MotRevL, MotSpdCL, MotSpdL, VlvMotL, VlvL, VlvS, Vlv2WayL, VlvAnL, VlvPosL, DoseL, CntOhSc, CountScL, CountOh, TotalL, TimeTrig, SelA16In, PidConL, PIDConS, PIDConR, PIDStepL, FmCont, FmTemp, ModPreCon, MPC10x10, KalFilt, AV, MonAnL, MonAnS, MonDiL, MonDiS, MonDi08,
- When switching between the external and internal setpoint in **PIDConR**, the PID algorithm is initialized depending on Feature Bit 14.
- For the following blocks, depending on the Feature Bit, the limit in the limit view is shown as grayed out with limiting switched off (for example: PV_AH_En = 0):
MotSpdCL, VlvAnL, DoseL, CntOhSc, CountOh, PidConL, PIDConS, PIDConR, PIDStepL, ModPreCon, MPC10x10, ConPerMon, MonAnL, MonAnS, OpAnL

4.6.2 Changes to Version 9.0 SP2

- The behavior with direction-dependent interlock has been improved at the **VlvMotL** and **VlvPosL** blocks.

NOTICE

The following change in behavior results:

Previous behavior:

With direction-dependent interlock, the drive was always stopped independent of SafePos.

Corrected behavior:

With direction-dependent interlock or protective interlock and control in the interlock direction, the drive moves to the idle state SafePos, if possible. The drive goes to the stop state with an interlock in the direction of idle state Open or Closed (SafePos =1, Intlock/Protect =0 or SafePos =0, IntlRev/ProtRev =0).

Check the parameter assignment of SafePos.

- The blocks **VlvMotL**, **VlvPosL** and **VlvAnL** can be reset immediately after an outgoing protective interlock, as long as no error is pending.
- With Feature Bit 14, the start-up behavior of scale dosing can be influenced for the **DoseL** block. After starting the scale dosing function, the controls are activated only after the scales have been tared (StandStill =1).
- The correction function of the dribbling quantity (DribbCor =1) when dosing is canceled is not effective at the **DoseL** block.
- During the RelaxTime, the **DoseL** block now also goes with DribbOut =0 into the dribbling state. In case of overdosage or underdosage, you can acknowledge this message with Feature2 Bit 24 =1. If the dosage does not go into the dribbling state, the dribbling time must be additionally configured to zero (RelaxTime =0) with DribbOut =0.
- With separate interlocking (Feature2 Bit16 =1) at the **MotRevL**, **VlvMotL** and **VlvPosL** blocks, the display of the lock symbol at the block icon has been improved for pure interlocking.
- With separate interlocking (Feature2 Bit16 =1) at the **VlvMotL** and **VlvPosL** blocks, the operating authorization has been improved for interlocked switch-on enable.
- The **VlvAnL** block displays the limits of the manipulated variable error difference (ER) in the limit view also in the case of MsgLock =1 and Feature Bit 28 =1 and has thus been adapted to the limit displays of the APL.
- The tolerance band of the manipulated variable difference PosDeadBand with **VlvAnL** is now also included in the calculation of the feedback signals FbkOpenOut and FbkCloseOut at the end positions PosDiOpen and PosDiClose. A construction-related offset of the MV control to the Rbk feedback does not result in a monitoring error with corresponding parameter assignment of PosDeadBand.
- The calculation of the RdyToStart output parameter has been adapted at the blocks **DoseL**, **MotL**, **MotRevL**, **MotS**, **MotSpdCL**, **MotSpdL**, **Vlv2WayL**, **VlvAnL**, **VlvL**, **VlvMotL**, **VlvPosL**, **VlvS**. Feature Bit 9 is now also taken into consideration.

- At the **CountOH**, **CountScL**, **DoseL**, **FmCont**, **FmTemp**, **KalFilt**, **MonAnL**, **MonAnS**, **MotSpdCL**, **PIDConL**, **PIDConR**, **PIDConS**, **PIDStepL**, **TotalL**, **VlvAnL**, **VlvPosL** blocks, the status of the **RbkOut.ST** feedback signals and the **xxxAct.ST** switching point in "Out of service" mode is no longer calculated cyclically, but only on transition to "Out of service".
- If the position feedback **Rbk** is not interconnected for the **PIDConL** and **PIDConR** controller blocks, the signal status of the **RbkOut.ST** output for the simulation is also not interconnected to **16#FF**.
- With initial start after an instantiation in the CFC followed by a full download with Feature Bit 0 =1, the idle state **Out1..3 =0** is output at the **OpDi03** block.
- With the blocks **OpDi01**, **OpDi03** and **OpTrig**, the signal status in the overview operator controls is no longer displayed in "Out of service" mode. For this, **ST_Worst** is set to **16#80** when the block is out of service.
- For the **PIDConS**, **PIDConL**, **PIDConR** controllers, the switchover from the "Out of service" operating mode to manual mode has been improved in the event that the idle state value **MV_SafePos** lies outside the manipulated variable limits.
- The calculation of the remaining ramp time **SP_RemRT**, **MV_RemRT** with ramp operation at the blocks **PIDConL**, **PIDConR**, **PIDStepL**, **MotSpdCL**, **OpAnL**, **VlvAnL** has been improved.
- The control behavior of the **PIDConR** controller with regard to the negative controller gain **NegGain =1** and the proportional component in the feedback circuit **PropFacSP <> 0** has been improved at the block **PIDKernR**.
- At **PIDConL** and **PIDConR** controller blocks, dynamic deactivation of the dead zone (Feature Bit 30 =1) has no effect if the default value **16#78** is set at the status signal of **MeanMV.ST**. This status is displayed at the parameter **ErrorNum =52**.
- Bits 4 and 5 are reset for **PIDConR** if **Feature.Bit 21 =0** for the **OS_PermLog** output. This has the effect that the operation via the block icon for switching between internal and external setpoint is disabled for invisibly switched operator controls for external setpoint.
- When a limit violation message is triggered, the simulation value is now also taken as the triggering accompanying value in simulation mode at the **MonAnL**, **PIDConL**, **PIDConR**, **PIDStepL**, **FmCont**, **FmTemp** blocks.
- It is now shown at **ModPreCon** just like for **MPC10x10** at **Status1 Bit29** if at least one manipulated variable is in tracking mode.
This bit uses the standard view to display the prediction of free movement.
- The operator authorizations for sampling point and sample result have been improved at the **KalFilt** block.
- Constant declarations were optimized at the controller blocks **AutoExcitation**, **ConPerMon**, **FmCont**, **FmTemp**, **KalFilt**, **ModPreCon**, **MPC10x10**, **PIDConL**, **PIDConR**, **PIDConS**, **PIDStepL**.
- The channel blocks **Pcs7AnOu**, **Pcs7DiIn**, **Pcs7DiOu** and **Pcs7DiIT** evaluate the quality information from the ET 200SP HA I/O module to form the signal status.

4.6 Version 9.0 SP2

- The generation of warnings when compiling with block drivers has been improved when using DI blocks with time stamping and the channel block **Pcs7DiIT**. The file al_chn_apl.xml has been modified for this.
- The signal status in case of an error has been standardized for the blocks **FbDrive** and **FbSwtMMS** and can be set with Feature Bit7 .
For Feature Bit 7 = 1, the signal status is set to "Uncertain, device related" (16#68). For Feature Bit 7 = 0 , "Bad, device related" (16#00) is output.
This means the default behavior of FbDrive in the event of an error has changed. To preserve the original behavior for FbDrive, Feature Bit7 =1 must be set.

4.6.3 Update Information for Version 9.0 SP2

The following applies to the software update from V9.0.1.2 to version 9.0 SP2:

1.	Make Textual Inter-connections	No
2.	Compile AS	Compile changes
3.	Download AS program	Download changes
4.	AS STOP necessary	No
5.	Compile OS	Complete compilation

List of changed blocks

Name	Number	Block version	Interface change	Code change
AutoExci	FB1842	5.1	No	No
AV	FB1903	5.1	No	Yes
CntOhSc	FB1803	5.2	No	Yes
ConPerMon	FB1805	5.2	No	Yes
CountOh	FB1864	5.2	No	Yes
CountScL	FB1806	5.2	No	Yes
DoseL	FB1809	5.2	No	Yes
FbAnIn	FB1813	9.1	No	No
FbAnOu	FB1814	9.2	No	Yes
FbAnTot	FB1817	9.1	No	No
FbDiIn	FB1815	9.1	No	No
FbDiOu	FB1816	9.2	No	Yes
FbDrive	FB1905	9.2	No	Yes
FbEnMe	FB1908	9.1	No	No
FbSwtMMS	FB1907	9.2	No	Yes

FmCont	FB1818	9.2	No	Yes
FmTemp	FB1819	9.2	No	Yes
Intlk02	FB1824	5.2	No	No
Intlk04	FB1825	5.2	No	No
Intlk08	FB1826	5.2	No	No
Intlk16	FB1827	5.2	No	No
KalFilt	FB1925	9.2	No	Yes
ModPreCon	FB1843	5.2	No	Yes
MonAnL	FB1845	5.2	No	Yes
MonAnS	FB1912	5.2	No	Yes
MonDi08	FB1847	5.2	No	Yes
MonDiL	FB1848	5.2	No	Yes
MonDiS	FB1913	5.1	No	Yes
MotL	FB1850	5.1	No	Yes
MotRevL	FB1851	5.1	No	Yes
MotS	FB1910	5.1	No	Yes
MotSpdCL	FB1854	5.2	No	Yes
MotSpdL	FB1856	5.1	No	Yes
MPC10x10	FB1920	5.2	No	Yes
OpAnL	FB1865	5.2	No	Yes
OpAnS	FB1915	5.1	No	Yes
OpDi01	FB1867	5.2	No	Yes
OpDi03	FB1867	5.2	No	Yes
OpTrig	FB1868	5.2	No	Yes
Pcs7AnIn	FB1869	9.1	No	No
Pcs7AnOu	FB1870	9.1	No	Yes
Pcs7Cnt1	FB1833	9.1	No	No
Pcs7Cnt2	FB1834	9.1	No	No
Pcs7Cnt3	FB1835	9.1	No	No
Pcs7DiIn	FB1871	9.2	No	Yes
Pcs7DiOu	FB1873	9.2	No	Yes
Pcs7DiIT	FB1872	9.2	No	Yes
PIDConL	FB1874	5.2	No	Yes
PIDConR	FB1875	5.2	No	Yes
PIDConS	FB1875	5.2	No	Yes
PIDKernR	FB1877	5.0	No	Yes
PIDStepL	FB1878	5.2	No	Yes
Rcv_AnaVal	FB1894	5.2	No	Yes
Rcv_DigVal	FB1892	5.2	No	Yes
SelA16In	FB1888	5.2	No	Yes
TimeTrig	FB1802	5.2	No	Yes
Totall	FB1906	5.2	No	Yes
Vlv2WayL	FB1897	5.1	No	Yes
VlvAnL	FB1896	5.2	No	Yes

4.7 Version 9.0 SP2 Update 1

VlvL	FB1899	5.1	No	Yes
VlvMotL	FB1900	5.1	No	Yes
VlvPosL	FB1918	5.1	No	Yes
VlvS	FB1911	5.1	No	Yes

Note

- If "No" is listed in the column "Code change", only attributes, message texts and/or version number have been changed.

4.7 Version 9.0 SP2 Update 1

4.7.1 Changes in version 9.0 SP2 Update 1

- The periodic monthly output for the **TimeTrig** block now also goes beyond the end of the year and for a parameter assignment `DayOfMonth = 29.30,31`. For this change to take effect for a monthly trigger that has already begun, the periodic trigger must be switched off and then on again.
- If an ET 200SP HA I/O module delivers the status information `QI = 0` (bad), the **Bad** output of the **Pcs7AnIn** channel block is not set in simulation mode (`SimOn = 1`).
- At the **DoseL** block, simulation mode with interconnected inputs (`SimLiOp = 1`) is also possible for flow dosing. The flow is simulated via `SimPV_Li`, and the dosage via a change to the `SimDQ_Li` parameter.
- At the **MotRevL**, **MotSpdL**, **VlvMotL**, **VlvPosL** and **VvAnL** blocks, directional protection interlocks can now also be reset individually.
- The **MotSpdCL** block now also outputs the operating error "`SP_LiOp = 1, SP_IntLi = 1` and `SP_ExtLi = 1`" at the output `ErrorNum = 51`.
- When exiting local mode (`LocalSetting = 2.4`) in manual mode, the position feedback at the **VlvAnL** block is adopted as the manipulated variable. As a result, switchover is now bumpless.
- At the **VlvPosL** block, the "simulation" status of an input parameter, e.g. the position feedback, is no longer transferred to the status of the `MV_Out` manipulated variable. This causes external simulation to be reduced, and the `MV_Out` output can be used for control via the **Pcs7AnOu** channel block.

- The **MonAnL** block now also outputs the error message > 999,999 for **SmoothTi** at the **ErrorNum** output for a cycle at the output **ErrorNum =51**.
- In automatic and simulation mode, manipulated variable jumps no longer occur at the **PIDConL** and **PIDConS** controller blocks when changing the setpoint. The control deviation is zero, and the manipulated variable remains constant. For **PIDConR**, the setpoint history **SP** and actual value history **PV_Out** are now identical. However, unlike **PIDConL** and **PIDConS** the manipulated variable tries to control the actual value at the input **PV** to the setpoint **SP**.

4.7.2 Update information for version 9.0 SP2 Update 1

The following applies when updating the software from V9.0.2 to version 9.0.2 Update 1:

1.	Make Textual Inter-connections	No
2.	Compile AS	Compile changes
3.	Download AS program	Download changes
4.	AS STOP necessary	No
5.	Compile OS	Not necessary

List of changed blocks

Name	Number	Block version	Interface change (AS stop necessary)	Code change
DoseL	FB1809	5.2	No	Yes
MonAnL	FB1845	5.2	No	Yes
MotRevL	FB1851	5.2	No	Yes
MotSpdCL	FB1854	5.2	No	Yes
MotSpdL	FB1856	5.2	No	Yes
Pcs7AnIn	FB1869	9.2	No	Yes
PIDConL	FB1874	5.2	No	Yes
PIDConR	FB1875	5.2	No	Yes
PIDConS	FB1830	5.2	No	Yes
TimeTrig	FB1802	5.2	No	Yes
VlvAnL	FB1896	5.2	No	Yes
VlvMotL	FB1900	5.2	No	Yes
VlvPosL	FB1918	5.2	No	Yes

Note

The comment [Release 09.00.02.01] has been inserted in all changed blocks.

4.8 Version 9.0 SP3

4.8.1 What's new in Version 9.0 SP3?

- Channel block **Pcs7DiCnt** (FB1935) for use of counting and frequency measuring functionality of the modules
 - CFU PA (6ES7 655-5PX11-0XX0) V1.2
 - CFU DIQ (6ES7 655-5PX31-1XX0) V1.2
 - ET 200SP HA multi-function module DI16/DQ16 x 24VDC HA (6DL1 133-6EW00-0PH1) V1.1.1
- Channel block **Pcs7AITC** (FB1933) for use with
 - Dynamic scalable measuring range of the ET 200SP analog input module AI4 x RTD/TC 2,3,4-wire HF (6ES7 134-6JD00-0CA1) V2.0 for measuring type/range Thermocouple Type K
 - REAL process values of the ET 200SP HA analog input module AI16 x TC/8xRTD 2-/3-/4-wire HA (6DL1 134-6JH00-0PH1) V1.1 for measuring type/range Thermocouple Type K

Note

For use of the new Pcs7DiCnt and Pcs7AITC channel blocks, you need at least **PCS 7 V9.0 SP2** with:

- PCS 7 Basis Library V9.0 SP3
- PCS 7 Basis Faceplates V9.0 SP3
- CFC V9.0 SP3 Upd 1

All three products are included in the Update Collection 1 for PCS 7 V9.0 SP2.

Other new features:

- To allow you to work with structures of type DINT, BYTE (e.g. PV_OutCnt output in the Pcs7DiCnt block), the new conversion blocks **StruCnIn** and **StruCnOu** are available.
- When `Feature2 Bit9 = 1` at the **MotL**, **MotSpdCL**, **MotRevL**, **MotSpdL**, **Vlv2WayL**, **VlvL**, **VlvPosL**, **VlvMotL** blocks, a control in local mode is only possible with a 0->1 edge.
- For specification of the labeling of the interlock buttons, the following blocks have been adapted: **DoseL**, **MotL**, **MotRevL**, **MotS**, **MotSpdCL**, **MotSpdL**, **Vlv2WayL**, **VlvAnL**, **VlvL**, **VlvMotL**, **VlvPosL**, **VlvS**, **OpDi01**, **OpDi03**, **PIDConL**, **PIDConR**. The button texts can be configured in the CFC using "Text 1" of the respective interlock input.

4.8.2 Changes in Version 9.0 SP3

- Dosing with the **DoseL** block can now also be started if the setpoint is greater than the low dosing limit.
- The structure outputs (e.g. `GrpErr`) of the **DoseL** block are reinitialized during startup after a CPU stop or in "Out of service" mode.
- Monitoring of the feedbacks for implausible values at the **VlvAnL** block is also active in local mode `LocalSetting = 2/4`.
- The **VlvAnL** block now also outputs the invalid parameter assignment `MV_LiOp = 1`, `MV_IntLi = 1` and `MV_ExtLi = 1` at output `ErrorNum = 51`.
- After a changeover of the **VlvAnL** block with activated ramp to local mode `LocalSetting = 2/4`, "Manipulated variable ramp active" is no longer displayed in the standard view because the manipulated variable is tracked to the readback value and the ramp is deactivated.
- The alarm limits `ER_AH_Act`, `ER_AL_Act` are now also calculated and the ON delays `ER_A_DC` are active when `SafePos = 2` is set at the **VlvAnL** block.
- The **VlvAnL** block also displays the limits of the manipulated variable difference (ER) in the limit view when `MsgLock = 1` and `Feature Bit 28 = 1` is set, thereby adapting it to the limit displays of the APL.
- In automatic mode, the **VlvAnL** block without an auxiliary valve also resets its warning display `WarnAct` after expiration of the warning time after a control via `OpenAut`, `CloseAut`.
- An error message is now also output at the **VlvPosL** block after a position feedback monitoring error when position control is active.
- A direct control by the CFC is also no longer possible at the **VlvPosL** block in case of a start interlock.
- The `CascaCut` output of the **VlvPosL** block is now also set when tracking is active and when position control is deactivated.
- The status bits of the **VlvPosL** block have been adapted in such a way that the symbols for the ON delays of the manipulated variable differences appear correctly in the overview of the limit view.
- The valve position is tracked at the **VlvPosL** block for time `V_MonTiStatic` after a motor stop, as in the case of the **VlvMotL** block.

- The position feedback `RbkOut` is tracked to the limited manipulated variable `MV_Out` at the **VlvPosL** block during simulation in automatic mode. This prevents a monitoring error from occurring. The status of the switching points `MV_HiAct`, `MV_LoAct` is now also tracked to the status of the manipulated variable `MV_Out`.
- When the "Seal valve" function is enabled at the **VlvPosL** block, the `TorqClose` input is now also taken into account for a `Close` control.
- The vibration function of the **VlvPosL** block has been revised. The `TorqClose` and `TorqOpen` inputs now act as switches for the occurrence of increased torques. When reversing, the torque can return to the good state at the `TorqClose` and `TorqOpen` inputs without canceling the vibration function.
- In the case of the **VlvPosL** and **VlvMotL** blocks, the rapid stop function for motorized valves can be unlocked using the "Reset" button of the **standard view** independent of the valve feedbacks. Consequently, the blocks behave the same as when reset with the `RstLi` input. After a monitoring error, the rapid stop can now be reset and the valve can move to the Open or Closed neutral position.
- The "Tracking mode active" display of the **VlvAnL** and **VlvPosL** blocks has been revised. If the block goes to the neutral position after an error, tracking mode is no longer displayed.
- When `Feature.Bit13 = 1` is set at the **MotSpdCL** block, the monitoring time for stopping `MonTiDyStop` is used.
- The `RdyToReset` output of the **MotL**, **MotRevL**, **MotSpdCL** and **MotSpdL** motor blocks is now also evaluated in local mode.
- During `CPU` startup via `OB100`, stop pulses are now set for the **MotL**, **MotRevL**, **MotSpdL**, **VlvL**, **VlvMotL** and **VlvPosL** blocks with `Feature Bit0 = 0`.
- After a static monitoring error for compliance with the operating behavior or valve position, the **MotL**, **MotRevL**, **MotSpdCL**, **MotSpdL**, **VlvL**, **Vlv2WayL**, **VlvMotL** and **VlvPosL** blocks set a control output pulse, e.g. `P_Close`, in order to put the motor or valve in the neutral position, even if it is already in neutral position.
- An active start interlock is also then displayed at the **DoseL**, **MotL**, **MotRevL**, **MotSpdCL**, **MotSpdL**, **Vlv2WayL**, **VlvAnL**, **VlvL**, **VlvMotL** and **VlvPosL** blocks if the block is not in neutral position.
- When an invalid value is entered for the `TimeFactor` parameter at the **FmCont**, **FmTemp**, **MonAnL**, **MotSpdCL**, **OpAnL**, **PIDConL**, **PIDConR**, **PIDStepL**, **RateLim** and **VlvAnL** blocks, the old value is written back to the input.
- The bypass function of the **MonDiL** block can no longer be enabled using `BypInLi` when simulation is active.
- Operator control of the actuating signals when `ModLiOp = 1` is set has been improved in the **standard view** for the **PIDStepL** block when operated "without position feedback".
- The internal simulation of the **PIDConR** block now functions the same as **PIDConL** and **PIDConS**. The output of the actual value `PV_Out` is also adapted at a setpoint change. The control deviation remains constantly at zero, and the manipulated variable is frozen. The process value `PV` is **not** corrected.
- At a changeover from manual to automatic simulation mode, step changes of the manipulated variable no longer occur at the **PIDConL**, **PIDConS** and **PIDStepL** blocks.
- The status bits of the **PIDConR** and **PIDConL** blocks have been adapted in such a way that the delay of the `ER` alarms is correctly displayed in the limit view.

- The delay for incoming warnings at the operating points `RbkWH_Act`, `RbkWL_Act` of the feedback value `Rbk` has been corrected for the **VlvPosL** and **PIDConR** blocks.
- The periodic monthly output for the **TimeTrig** block now also works beyond the end of the year and for a parameter assignment `DayOfMonth = 29,30,31`.
- If the single trigger is switched on and off while a periodic trigger is active, the next pending trigger of the **TimeTrig** block is updated.
- The comment for the `Mode` input of the **FlipFlop** function is adapted.
- The status calculation of several outputs of the **FbEnMe** block when `MS_Ext = 16#5`, `16#6` has been adapted.
- The comment for output parameter `StrctOut.Byte28` of the **StrgToBy** block has been adapted.
- The calculation of `Bad` values and status values at the outputs of the **FlowCorr** block in the case of invalid status values at the inputs has been improved.
- Improved support of **SENTRON** communication-capable **3VA** molded case circuit breakers on PROFINET
- The simulation of overflow and underflow values at the channel block **Pcs7AnIn** results in `Bad = 1`.
- Correction of the standardization of the process value when `NamurOff=1`
- Taking account of input parameters `HighLimit` and `LowLimit` when handling output parameters `PV_HiAct` and `PV_LoAct`

4.8.3 Update Information for Version 9.0 SP3

The following applies to the software update from V9.0.2 Upd1 to version 9.0 SP3:

1.	Make Textual Inter-connections	No
2.	Compile AS	Compile changes
3.	Download AS program	Download changes
4.	AS STOP necessary	No
5.	Compile OS	Complete compilation

List of changed blocks

Name	Number	Block version	Interface change	Code change
DoseL	FB1809	5.3	No	Yes
FbEnMe	FB1908	9.3	No	Yes
FlipFlop	FC389	5.3	No	Yes
FlowCorr	FB1916	5.1	No	Yes
FmCont	FB1818	9.3	No	Yes

FmTemp	FB1819	9.3	No	Yes
MonAnL	FB1845	5.3	No	Yes
MonDiL	FB1848	5.3	No	Yes
MotL	FB1850	5.3	No	Yes
MotRevL	FB1851	5.3	No	Yes
MotS	FB1910	5.3	No	Yes
MotSpdCL	FB1854	5.3	No	Yes
MotSpdL	FB1856	5.3	No	Yes
OpAnL	FB1865	5.3	No	Yes
OpDi01	FB1866	5.3	No	Yes
OpDi03	FB1867	5.3	No	Yes
Pcs7AITC	FB1933	9.3	New block	Yes
Pcs7AnIn	FB1869	9.3	No	Yes
Pcs7DiCnt	FB1935	9.3	New block	Yes
PIDConL	FB1874	5.3	No	Yes
PIDConR	FB1875	5.3	No	Yes
PIDConS	FB1830	5.3	No	Yes
PIDStepL	FB1878	5.3	No	Yes
RateLim	FB1882	5.1	No	Yes
StrgToBy	FC384	5.1	No	Yes
StruCnIn	FC458	5.0	New block	Yes
StruCnOu	FC459	5.0	New block	Yes
TimeTrig	FB1802	5.3	No	Yes
Vlv2WayL	FB1897	5.3	No	Yes
VlvAnL	FB1896	5.3	No	Yes
VlvL	FB1899	5.3	No	Yes
VlvMotL	FB1900	5.3	No	Yes
VlvPosL	FB1918	5.3	No	Yes
VlvS	FB1911	5.3	No	Yes

Note

- If "No" is listed in the column "Code change", only attributes, message texts and/or version number have been changed.

Information on configuration and operation

- The **blocks in the library** have been designed exclusively for **S7-400** automation systems and are not suitable for the configuration of failsafe applications.
- The following applies to **AS blocks** that contain **ALARM_8P** blocks:
Only the data types **BOOL** are permitted (not permitted: Bit array), **BYTE**, **CHAR**, **WORD**, **INT**, **DWORD**, **DINT**, **REAL**, **DATE**, **TOD**, **TIME**, **S5TIME**, **DATE_AND_TIME**, **COUNTER**, **TIMER**. Copy a **STRING** data type into an **ARRAY OF BYTE**. Structures must be interconnected with the message auxiliary values via a converter block. Otherwise, these message auxiliary values are always displayed with "0".
The initial interconnection of an auxiliary value or the data type (in case of a value change) takes effect only after restarting the CPU.
- The **templates** contain CFC charts with ready-made technological functions. These charts include the blocks and interconnections that are required as default for each of the functions. You can continue to use these charts as a template for individual automation solutions in the future. The templates are described in detail in the Online Help.
- You are not permitted to set the **minimum cycle time** of OB1 to a value other than 0.
- With **CPU 410 PA SMART**, the minimum cycle time of OB1 is permanently set to 200 ms.
- Please note that the signal status of the individual block I/Os is not evaluated by the SFC type because the SFC type does not offer any characteristics of the type Struct.
- **Interconnecting inputs and outputs with APL structures** to inputs and outputs of blocks without structures.
This CFC function (as of PCS 7 V7.1 SP1) allows APL blocks to be interconnected to blocks from other libraries without a converter block. This simplifies the engineering. However, this function may result in an interruption of the Flow signal status.
Example: Interconnection of **BOOL** output with structure to **BOOL** input without structure and further interconnection. **BOOL** output without structure to **BOOL** input with structure. If the Flow signal status is to be maintained, the signal status must be redirected around the non-APL logic using converter blocks.
The interconnection of an APL **DINT** structure with a **DINT** input/output is not yet supported at present. The converter blocks **StruCnIn/StruCnOu** must be used for this.
- The **FbAnIn**, **FbAnOu**, **FbDiIn** and **FbDiOu** channel blocks support FF field devices with analog or digital input and output values. The first implementation stage of the use of FF devices behind Profibus Slave AB7000 (introduced for PCS 7 V7.0) is no longer supported.
- If the **EventTS/Event16TS** block is interconnected with the **EventTsIn** input in a technological block, the **EventTs** and the technological block must be installed in the same cyclic interrupt OB of the same CPU.
- **I/O ManModLi**
The attribute **S7_contact** is missing on the **ManModLi** and must be set manually if needed at the block interface. You can reach the interface by double-clicking the appropriate block in the block folder. To retain backward compatibility with existing projects, the attribute can no longer be set because otherwise the existing connections between the SFC and the block would be changed.

- **Feature "Separate evaluation of excluded and simulated interlock signals"**
If the `Feature, Feature2 Bit2` is enabled, the signal may not be inverted per CFC for interconnections to the inputs, otherwise the bypass display cannot be refreshed for system related reasons.
This affects the following interlock inputs (as of APL 8.0 SP2):
Intlk02, Intlk04, Intlk08, Intlk16: `In01, In02, ...`
DoseL, MotL, MotRevL, MotSpdL, MotSpdCL, VlvL, Vlv2WayL, VlvAnL, VlvMotL, VlvPosL: `Permit, Interlock, Protect`
MotRevL: `Permit, Interlock, Protect, PermRev, IntlRev, ProtRev`
MotS, VlvS, OpDi01, OpDi03, PIDConL, PIDConR: `Interlock`
For the inversion of the interlock signals, the inputs `InvIn01, InvIn02...` can be used at the interlock blocks.
- **LAG: block**
A change to the `SampleTime` first takes effect after a change to the delay time `LagTime` or after resetting the block (`Reset = 1`).
- Before using the **PCS 7 example project Advanced Process Control** (APL_Example_xx, xx refers to the language version), it is recommended that the function blocks of the PCS 7 Advanced Prozess Library and the basic data contained within it be updated using the OS Project Editor.
- Quality information (**QI bit**) is only supported for **ET 200SP HA modules**.
- **DoseL: block**
Acknowledgement following an overdosage (`Feature2 bit 24 = 1`) is only requested for a dribbling quantity (`DribbIn > 0`). If the dosing system operates without a dribbling quantity and an overdosage requires acknowledgement, this can be achieved by parameterizing a very small dribbling quantity.
- Channel blocks **FbDrive, FbSwtMMs:**
The selection as to whether the CFC installs the standard diagnostic blocks of the Basis Library or the diagnostic blocks of an AddOn Library for "Create module driver" is made with `Feature Bit 9` (as of CFC version 9.0.1.2).
0 = Diagnostic blocks from Basis Library, 1 = Diagnostic blocks from an AddOn Library.
- **MonDiL, MonDiS blocks:**
A change of the `Color` parameter does not take effect until after a picture change.
- If the **PIDConL, PIDConS, PIDConR, PIDStepL** controller blocks are in simulation mode, manipulated variable jumps can also occur in automatic mode at setpoint changes.
- **Signaling of limit violation**
If signal 0 is active (`Feature bit 29 = 1`) and "last saved value" was selected for the startup characteristics (`Feature bit 0 = 1`), the limit violation messages are triggered after a complete download of the user program.

Notes on the documentation

- The terms or message classes Alarm, Warning, Tolerance or the corresponding acronyms in icons and colors used in the documentation are not valid when using user-configured message classes.
These terms and colors depend on the project-specific setting.
The **user-configured alarm classes** are only supported by block icons from the template pictures "@PCS7TypicalsAPLV8.PDL" or template "@TemplateAPLV8.PDL" .
- In the section "Local operation" of the documentation, subsection „LocalSetting = 2 and LocalSetting = 4" state that the runtime monitoring of the block is disabled. The following should be stated here: "The runtime monitoring only works with rapid stop, external errors, motor protection and when both feedback signals are set (discrepancy)."
- The following has to be replaced in the chapter "**MotSpdCL functions**" in section "**Controlling a device infeed or inverter enable**"
 - OLD:
When the function is activated, the motor can also be started directly. When starting forwards or backwards the device infeed or inverter enable is also activated. The frequency converter automatically determines the correct sequence. The motor can now be stopped and restarted without having to switch off the device infeed or inverter enable. The activation of the device infeed or inverter enable for starting the motor can be performed in the automatic, manual and local operating modes with local setting 1 or 3, or by forcing.
 - NEW:
When the "device infeed" function is activated, the motor can also be started directly: The device infeed is also activated when starting in forward or reverse. The frequency converter automatically determines the correct sequence. The activation of the device infeed for starting the motor can be performed in the automatic, manual and local operating modes with local setting 1 or 3, or by forcing.
- The following must be replaced in the "**Redundancy**" section of the "**Description of Pcs7AnIn**" chapter.
 - OLD:
If both signals deliver a "bad" quality code, the substitute value is passed on to the process with a "bad" quality code
 - NEW:
If both signals deliver a "bad" quality code, output Bad = 1 is set and the last valid value, a substitute value or the invalid value takes effect depending on the configuration of the Feature parameter.

- The following must be replaced in the "Redundancy" section of the "Description of Pcs7AnOu" chapter.
 - OLD:

If both signals deliver a "bad" quality code and an "E/E redundancy warning" (Mode = 16#x5xxxxxx) is issued, 50% of the value of the application program is passed on to the process.

If both signals deliver a "bad" quality code, the last process value is retained.
 - NEW:

If both signals deliver a "good" quality code and an "E/E redundancy warning" (Mode = 16#x5xxxxxx) is issued, 50% of the PV_In value takes effect at each of the outputs PV_Out and PV_OutSlv.

If both signals deliver a "bad" quality code, 100% of the PV_In value takes effect at each of the outputs PV_Out and PV_OutSlv.
- The following must be replaced in section "Program mode for controllers" under the heading "Program mode with setpoint specification":
 - OLD:

Controller is preferably in manual mode, but it can also be in automatic mode.
 - NEW:

Controller must be in automatic mode.
- The new converter blocks **StruCnIn** and **StruCnOu** are missing in the "Converter blocks" section.
 - **StruCnIn** (FC 458):

The block separates a structure connected to input parameter In (count value: Out.Value, Out.ST) into a tag (Out) of data type DINT and a signal status (ST).
 - **StruCnOu** (FC 459):

The block merges the count value Value of data type DINT and a signal status (ST) of data type BYTE into a structure (count value: Out.Value, Out.ST).
- The note that the simulation value is specified in counting mode with input parameter SimPV.Value is missing in the "Functions of Pcs7DiCnt" section.
If SimPVCnt.ST is different from 16#FF, the simulation value is specified with input parameter SimPVCnt.Value.
- The "Forcing operating modes" note in the "Functions of VlvAnL" section must read as follows:
 - **Note:**

The range high limit MV_HiLim is output at output MV when OpenForce =1 and the range low limit MV_LoLim when CloseForce =1.

If the block is operated with an auxiliary valve, the OpenForce and CloseForce commands also affect the auxiliary valve.

When CloseForce =1, the auxiliary valve is closed, thereby triggering the neutral position of the control valve regardless of the MV output.

A configured ramp limit has no effect.

- The column heading must be changed in the "Requirements for using a setpoint ramp" table in the "**Setpoint ramp**" section:
 - OLD: *Manipulated variable*
 - NEW: *Setpoint*

Change history of PCS 7 Advanced Process Library

Changes since delivery release PCS 7 Advanced Process Library Readme (online)

Version	Edition	Change
2019-02-02 (ONLINE)	02/2019	Delivery status PCS 7 Advanced Process Library V9.0 SP3

