SIEMENS

SIMATIC

Process Control System PCS 7 PCS 7 Advanced Process Library Readme V9.0 SP3 Update 9 (online)

Readme

Security information 1

Overview 2

Notes on installation 3

New features and changes as compared to previous versions 4

Information on configuration and operation 5

Notes on the documentation 6

Change history of PCS 7 Advanced Process Library 7

Version: 2023-09-29 (Online)

V9.0 SP3 Update 9
A5E46025415-AK

Legal information

Warning notice system

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.

⚠ DANGER

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.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

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.

Proper use of Siemens products

Note the following:

⚠ WARNING

Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

Trademarks

All names identified by ® are registered trademarks of Siemens AG. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

Disclaimer of Liability

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.

Siemens AG
Digital Industries
Postfach 48 48
90026 NÜRNBERG
GERMANY

A5E46025415-AK
Ⓟ 09/2023 Subject to change

Copyright © Siemens AG 2019 - 2023.
All rights reserved

Table of contents

1 Security information 5

2 Overview 7

3 Notes on installation 9

3.1 Scope of delivery 9

3.2 Hardware requirements 9

3.3 Software requirements 9

3.4 Installing the PCS 7 Advanced Process Library 9

4 New features and changes as compared to previous versions 11

4.1 Version 9.0 11
4.1.1 What's New in Version 9.0? 11
4.1.2 Changes in version 9.0 13
4.1.3 Update information for version 9.0 13

4.2 Version 9.0 Update 1 15
4.2.1 Changes in version 9.0 Update 1 15
4.2.2 Update information for version 9.0 Update 1 16

4.3 Version 9.0 SP1 16
4.3.1 What's new in Version 9.0 SP1? 16
4.3.2 Changes to Version 9.0 SP1 17
4.3.3 Update Information for Version 9.0 SP1 18

4.4 Version 9.0 SP1 Update 1 19
4.4.1 Changes in version 9.0 SP1 Update 1 19
4.4.2 Update information for version 9.0 SP1 Update 1 19

4.5 Version 9.0 SP1 Update 2 20
4.5.1 Changes in version 9.0 SP1 Update 2 20
4.5.2 Update Information for Version 9.0 SP1 Update 2 21

4.6 Version 9.0 SP2 22
4.6.1 What's new in Version 9.0 SP2? 22
4.6.2 Changes to Version 9.0 SP2 23
4.6.3 Update Information for Version 9.0 SP2 25

4.7 Version 9.0 SP2 Update 1 27
4.7.1 Changes in version 9.0 SP2 Update 1 27
4.7.2 Update information for version 9.0 SP2 Update 1 28

4.8 Version 9.0 SP3 29
4.8.1 What's new in Version 9.0 SP3? 29
4.8.2 Changes in Version 9.0 SP3 30
4.8.3 Update Information for Version 9.0 SP3 32

4.9 Version 9.0 SP3 Update 1 34
4.9.1 Changes in Version 9.0 SP3 Update 1 34

4.9.2 Update Information for Version 9.0 SP3 Update 1 34

4.10 Version 9.0 SP3 Update 2 35
4.10.1 Changes in version 9.0 SP3 Update 2 35
4.10.2 Update information for version 9.0 SP3 Update 2 36

4.11 Version 9.0 SP3 Update 3 38
4.11.1 Changes in version 9.0 SP3 Update 3 38
4.11.2 Update Information for Version 9.0 SP3 Update 3 39

4.12 Version 9.0 SP3 Update 4 40
4.12.1 Changes in version 9.0 SP3 Update 4 40
4.12.2 Update information for Version 9.0 SP3 Update 4 41

4.13 Version 9.0 SP3 Update 5 42
4.13.1 Changes in version 9.0 SP3 Update 5 42
4.13.2 Update Information for Version 9.0 SP3 Update 5 43

4.14 Version 9.0 SP3 Update 6 44
4.14.1 Changes in version 9.0 SP3 Update 6 44
4.14.2 Update Information for Version 9.0 SP3 Update 6 44

4.15 Version 9.0 SP3 Update 7 45
4.15.1 Changes in version 9.0 SP3 Update 7 45
4.15.2 Update Information for Version 9.0 SP3 Update 7 46

4.16 Version 9.0 SP3 Update 8 48
4.16.1 Changes in version 9.0 SP3 Update 8 48
4.16.2 Update Information for Version 9.0 SP3 Update 8 49

4.17 Version 9.0 SP3 Update 9 50
4.17.1 Changes in version 9.0 SP3 Update 9 50
4.17.2 Update information for Version 9.0 SP3 Update 9 50

5 Information on configuration and operation 53

6 Notes on the documentation 57

7 Change history of PCS 7 Advanced Process Library 63

Security information

1

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

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

Customers are responsible for preventing unauthorized access to their plants, systems, machines and networks. Such systems, machines and components should only be connected to an enterprise network or the internet if and to the extent such a connection is necessary and only when appropriate security measures (e.g. firewalls and/or network segmentation) are in place.

For additional information on industrial security measures that may be implemented, please visit
https://www.siemens.com/industrialsecurity.

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/cert.

Overview

2

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

3.1 Scope of delivery

The scope of delivery includes the following library:

- PCS 7 Advanced Process Library V9.0 SP3

3.2 Hardware requirements

The installation is subject to the conditions of SIMATIC PCS 7 V9.0 SP3.

3.3 Software requirements

- **SIMATIC PCS 7 V9.0 SP3** or higher

NOTICE
PCS 7 Advanced Process Library <=V9.0.3 was also usable under PCS 7 V9.0 SP1 . If you use PCS 7 Advanced Process Library <=V9.0.3 with PCS 7 V9.0 SP1 , use the following instructions: • **If you do not simultaneously upgrade the PCS 7 Basis Library to at least Version 9.0 SP 1 Update 2, the channel blocks of the PCS 7 Advanced Process Library will no longer function properly.** • **If you use a SENTRON communication-capable 3VA molded case circuit breaker on aPROFINET 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.

The library is installed via the PCS 7 master setup or by starting the Setup.exe program of the PCS 7 Advanced Process Library. You will receive all further information during the installation process.

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 provided in the "APL_Example_EU" example project.

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

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**

- 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**, **Pcs7DilT**, **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 Interconnections	**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 effect 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 hours and minutes 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 startup 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 MsgEvId1, MsgEvId2 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 STL. This does not cause the code to be changed.
- The bypass functionality has been enhanced. 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 are 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 have been 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 limits CPI_AL_Lim and CPI_WL_Lim may have to be adapted.
- In preparation for future versions of PCS 7, 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, assign parameters to the values for the Scale input parameter in accordance with your requirements (default values Low=0 und High=100).

4.3.2 Changes to Version 9.0 SP1

- At blocks **MotL**, **MotRevL**, **MotSpdCL**, **VlvMotL**, **VlvL**, **VlvAnL** and **VlvPosL**, 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**, **FbSwtMMS**, **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 **VlvAnL** 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 Interconnections	**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
FbSwtMMS	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
Pcs7HaAI	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 effect 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 **FbSwtMMS**, 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
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 startup 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 (DribCor =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, KaltFilt, 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 upon 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 in the case of invisibly switched operator controls for the external setpoint the operation via the block icon for switching between an internal and external setpoint is disabled.
- 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.
- 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 Interconnections	**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
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 Interconnections	**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 the 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 bypass information is always correctly displayed at the **DoseL** block during startup after **CPU stop**.
- 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 Interconnections	**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	No
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.

4.9 Version 9.0 SP3 Update 1

4.9.1 Changes in Version 9.0 SP3 Update 1

- At the block **PCS7AnIn**, the unit at the input `PV_InUnit` is applied correctly even in the event of a wire break.
- At the block **PCS7DiIT**, the calculation of the time stamp `TS_Out` has been improved. You can now use `Feature.Bit5` to select whether the CPU time or the IO time is used.
  Bit5=0: CPU time stamp (*default, same behavior as in previous versions*)
  Bit5=1: IO time stamp
- If an ET 200SP HA I/O module delivers the status information QI = 0 "bad", the Bad output of the **FbAnIn** channel block is no longer set in simulation mode (`SimOn` = 1).
- Dosing can no longer be started at the block **DoseL** with a pending error (`FaultExt` = 1 or `CSF` = 1 with `Feature Bit18` = 1).
- At the block **VlvPosL**, the pulse time `PulseTime` is no longer effective when stopping if position control is disabled. An active `BreakTime` is shown as delay in the "Display and operator controls" overview toolbar.
- At the block **VlvPosL**, the open or closed idle positions are now also approached even after a monitoring error that does not require a reset.
- At the blocks **VlvPosL**, **VlvAnL**, the status of `ER_AH_Act`, `ER_AL_Act` and `PosReached` is now always derived from the status `ER`.
- At the blocks **VlvAnL**, **MotSpdCL**, the parameter assignment of the key switch mode (Feature Bit4 = 1) is now also active when switching between internal and external manipulated variable or setpoint (`MV/SP_LiOp`, `MV/SP_ExtLi`, `MV/SP_IntLi`).
- At the blocks **MotSpdCL**, **OpAnL**, **PIDConL**, **PIDConR** and **PIDStepL**, the parameters `SP_UpRaLim`, `SP_DnRaLim` and `SP_RmpTime` can now no longer be operated in the ramp view when the corresponding parameters are used for interconnection.

4.9.2 Update Information for Version 9.0 SP3 Update 1

The following applies to the software update from V9.0 SP3 to version 9.0 SP3 Upd1:

1.	Close textual interconnections	**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	Code change
DoseL	FB1809	5.3	No	Yes
FbAnIn	FB1813	9.3	No	Yes
MotSpdCL	FB1854	5.3	No	Yes
OpAnL	FB1865	5.3	No	Yes
Pcs7AnIn	FB1869	9.3	No	Yes
Pcs7DiIT	FB1872	9.3	No	Yes
PIDConL	FB1874	5.3	No	Yes
PIDConR	FB1875	5.3	No	Yes
PIDStepL	FB1878	5.3	No	Yes
VlvAnL	FB1896	5.3	No	Yes
VlvPosL	FB1918	5.3	No	Yes

Note

The comment [Release 09.00.03.01] has been inserted in all changed blocks.

4.10 Version 9.0 SP3 Update 2

4.10.1 Changes in version 9.0 SP3 Update 2

- At the **MotSpdCL**, **OpAnL**, **PIDConL**, **PIDConR**, **PIDStepL** and **VlvAnL** blocks, the remaining runtime of the ramp is displayed depending on the TimeFactor in seconds, minutes and hours at output SP_RemRT, MV_RemRT and in the relevant previews as of PCS 7 Advanced Process Faceplates V9.0.3.1.
- The ramp mode with parameter assignment SP/MV_RmpModTime =1;Feature Bit6 =0have been optimized for the **FmCont**, **FmTemp**, **MotSpdCL**, **OpAnL**, **PIDConL**, **PIDConR**, **PIDStepL**, **VlvAnL**, blocks. With this parameter assignment, the ramp start value is does not change when the ramp target value is changed. The ramp slope and remaining ramp runtime will be adjusted accordingly. If the new ramp target value is less than the current ramp value, ramping is aborted and the new ramp target value is output as the actual or setpoint value. This now also applies to new ramp target values that are less than the ramp start value.
- The functions tracking or forced tracking have higher priority in automatic and manual operation than the valve commands open or close at the inputs OpenAut, CloseAut or OpenMan, CloseMan for the block **VlvAnL** without auxiliary valve.
- At the **VlvPosL** block, the hysteresis PosRbkHys is now also taken into consideration at the valve endstops PosDiOpen and PosDiClose.

- At the **VlvPosL** block, the motor protection function is sufficient for a reset , so that the input Trip returns to good condition and the valve is in the stop state. This is independent of SafePos. If the motor protection function is activated, the position control cannot be switched on.
- Following an analog monitoring error (RbkMonDynErr, RbkMonStaErr) that does not require a reset (Feature Bit 31 =0), at block **VlvPosL** the valve can also be controlled in manual mode during travel to the rest position using the Open/Close/Stop buttons.
- Following a monitoring error in position control and MonSafePos =0 at block **VlvPosL** , the motor control (Open =0, Close =0) is reset.
- Position control is retained at the block .**VlvPosL** when an interlock occurs. This means that the block behaves the same as before the APL 903.
- The direction-dependent disabling of the interlocking enables via Perm_En and PermRevEn for the blocks **VlvPosL** and **VlvMotL** has been improved.
- The status of ER.ST, ER_AH_Act.ST and ER_AL_Act.ST at the block **MotSpdCL** , is updated depending on RbkOut.ST and SP_Out.ST.
- The input of the gradient limit "L Alarm" in the **limit view** at block **MonAnL** is also possible when alarms are suppressed.
- In the NAMUR operation of the channel block ,**Pcs7AnIn** the current value 4..20mA was incorrectly output instead of the scaled process value for the input parameter NamurOff=1. This problem has now been resolved.
- You can now select Feature.Bit12=1 at channel block **Pcs7AnIn** so that at NamurOff=1 the output parameter PV_HiAct.Value or PV_LoAct.Value can be set additionally if HighLimit or LowLimit is exceeded.
- At the block **PCS7DiIT**, the calculation of the time stamp `TS_Out` has been improved. You can select via `Feature.Bit5` whether the CPU time or the IO time is used.
  Bit5=0: IO time stamp (*default, same behavior as in previous versions <=V9.0 SP3*)
  Bit5=1: CPU time stamp
  In addition, a correction has been made to this block to prevent invalid time stamping error messages.

4.10.2 Update information for version 9.0 SP3 Update 2

The following applies to the software update from V9.0 SP3 Upd1 to version 9.0 SP3 Upd2:

1.	Close textual interconnections	**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	Code change
FmCont	FB1818	9.3	No	Yes
FmTemp	FB1819	9.3	No	Yes
MonAnL	FB1845	5.3	No	Yes
MotSpdCL	FB1854	5.3	No	Yes
OpAnL	FB1865	5.3	No	Yes
Pcs7AnIn	FB1869	5.3	No	Yes
Pcs7DiIT	FB1872	9.3	No	Yes
PIDConL	FB1874	5.3	No	Yes
PIDConR	FB1875	5.3	No	Yes
PIDStepL	FB1878	5.3	No	Yes
VlvAnL	FB1896	5.3	No	Yes
VlvMotL	FB1900	5.3	No	Yes
VlvPosL	FB1918	5.3	No	Yes

Note

The comment [Release 09.00.03.02] has been inserted in all changed blocks.

4.11 Version 9.0 SP3 Update 3

4.11.1 Changes in version 9.0 SP3 Update 3

- The **FbEnMe** channel block has been revised with regard to the **calculation of the measured variables** for L1 (`CurLi1`), L2 (`CurLi2`) and L3 (`CurLi3`) and the **user data number format**.
  - The block evaluates the **scaling factors for the current values** L1, L2 and L3 contained in the input bytes 24-26 (`PZDin25..27`) and now calculates the measured variable according to the formula Current value [A] = Measured value in user data [mA] x 10 $^{\text{scaling factor}}$ x 0.001.
  - In addition, the measured values supplied by the module are interpreted and processed as UnsigedInt values according to the module specification and no longer as Integer values. All measured values in user data >32767, therefore, are now correctly processed and no longer output as negative values at the block outputs.

Note

If you have created a temporary solution for processing negative measured values at the block outputs, there may be a change in the behavior of your user program under certain circumstances. Check your configuration and remove the temporary solution from your user program.

- If you switch to manual mode in the error state, the `P_Rst` output is only set if the error state could also be acknowledged by the switchover.
  This affects the following blocks: **MotL**, **MotRevL**, **MotS**, **MotSpdCL**, **MotSpdL**, **Vlv2WayL**, **VlvAnL**, **VlvL**, **VlvMotL**, **VlvPosL** and **VlvS**.
- At the **MotRevL**, **MotSpdL**, **VlvAnL**, **VlvMot**, and **VlvPosL** blocks, a missing activation enable `PermRev=0` is in effect when a direction-dependent interlock is activated and a configured restart inhibit of 0 seconds (`IdleTime`=0) is configured. Up to now, the drive could be started in the "reverse" direction despite `PermRev`=0 and `IdleTime`=0
- In the external simulation (`SimLiOp = 1` and `SimOnLi = 1`), the **VlvAnL** block sets the readback value `RbkOut` equal to the simulation value `SimRbkLi` regardless of the setting of `Feature`.bit11.
- The monitoring behavior of the readback value `RbkOut` at the **VlvAnL** block for tracking mode (`MV_TrkOn =1`) has been improved.
- The "Tracking" and "Forced tracking" displays in the **standard view** and at the **block icon** has been deactivated at the **VlvAnL** block for local mode LocalSetting =2/4 , because the local mode LocalSetting =2/4 has a higher priority than tracking and forced tracking.
- The limit detection and the limit monitoring when switching on the position control has been improved at the **VlvPosL** block.
- The limit detection and the limit monitoring for active motor protection (`Trip=1`) has been improved at the **VlvPosL** block.
- The display of the reset button in the **default view** after a monitoring error of the position feedback signal has been improved at the **VlvPosL** block.

- The gradient limitation of the setpoint for the **PIDConL**, **PIDConR** and **PIDStepL** blocks takes effect when switching from the "Open control loop" state with setpoint tracking to the actual value (`SP_TrkPV =1`) to the "Closed control loop" state, for example to the external setpoint in automatic mode. Open control loop can be: Manipulated variable tracking (`MV_TrkOn =1`), Manipulated variable forced tracking (`MV_ForOn =1`), Manual mode (`ManAct =1`) or Neutral position with interlock (`Interlock =1`).
- The **PIDConR** block calculates the manipulated variable `MV` accordingly even with `NegGain=1`. The lower-level **PIDKernR** block has been corrected for this purpose.
- The behavior in case of negative differential pressure (`DiffP < 0`) can be configured at the **FlowCorr** block via Feature Bit10 and Bit11 .
  - `Feature Bit10`: Limit flow rate `Flow` to "0"
    `Bit=0`: `Flow` Calculated as absolute value (*default, same behavior as in versions <V9.0 SP3 Update 3*)
    `Bit=1`: `Flow` is limited to "0"
  - `Feature Bit11`: Calculate negative `Flow`
    `Bit=0`: `Flow` Calculated as absolute value (*default, same behavior as in versions <V9.0 SP3 Update 3*)
    `Bit=1`: `Flow` is calculated with sign

  If both `Feature Bits` are set, Bit10 has priority.
- The formation of the output `ST_Worst` (worst signal status) at the **OpTrig** block has been improved.

4.11.2 Update Information for Version 9.0 SP3 Update 3

The following applies to the software update from V9.0 SP3 Upd2 to Version 9.0 SP3 Upd3:

1.	Close textual interconnections	**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	Code change
FbEnMe	FB1908	9.3	No	Yes
FlowCorr	FB1916	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
OpTrig	FB1868	5.3	No	Yes
PIDConL	FB1874	5.3	No	Yes
PIDConR	FB1875	5.3	No	Yes
PIDKernR	FB1877	5.3	No	Yes
PIDStepL	FB1878	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

The comment [Release 09.00.03.03] has been inserted in all changed blocks.

4.12 Version 9.0 SP3 Update 4

4.12.1 Changes in version 9.0 SP3 Update 4

- If there is an error that requires a reset on the blocks **MotRevL, MotL, MotSpdL, MotSpdCL, MotS, VlvS, VlvPosL, VlvMotL, VlvL, VlvAnL, Vlv2WayL**, the reset pulse P_Rst is only output after changing to local operation with LocalSetting 2,4,5 if there is no active error.
- The **VlvAnL** block immediately generates a dynamic monitoring error when it is actuated to an end position if the feedback signal of the binary limit switch FbkOpen, FbkClose is already within the setting range. If the analog Rbk and binary feedback signals come in simultaneously, no monitoring error is generated.
- The bypass function is now also reset on start-up with Feature Bit0 =0 at the **PIDConL, PIDConR, PIDStepL, MonDiL, TotalL** blocks as with MonAnL.
- The tolerance band of the manipulated variable difference PosDeadBand for **VlvAnL** is now taken into account again when calculating 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.
  Note: This behavior is not effective in the version APL 9.0 SP3 Update 3.

- After a monitoring error in manual mode (Feature Bit 31 =0) that does not require a reset, the following drives can now be controlled again while moving to the idle position (MonSafePos =1): **MotRevL, MotL, MotSpdL, MotSpdCL, MotS, VlvS, VlvPosL, VlvMotL, VlvL, VlvAnL, Vlv2WayL**
  Note: This behavior is not effective in the version APL 9.0 SP3 Update 3.
- The **"PCS 7 - Process Tags Overview"** has been functionally extended. It can now also be filtered for suppressed messages. The following blocks were adapted:
  ConPerMon, CountOh, CountScL, DoseL, FmCont, FmTemp, MonAnL, MonAnS, MonDi08, MonDiL, MonDiS, MotL, MotRevL,, MotSpdCL, MotSpdL, PIDConL, PIDConR, PIDConS,, PIDStepL, TotalL, VlvAnL,, VlvMotL, VlvPosL

4.12.2 Update information for Version 9.0 SP3 Update 4

The following applies for the software update from V9.0 SP3 Upd3 to version 9.0 SP3 Upd4:

1.	Close textual interconnections	**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	Code change
ConPerMon	FB1805	5.2	No	Yes
CountOh	FB1864	5.2	No	Yes
CountScL	FB1806	5.2	No	Yes
DoseL	FB1809	5.3	No	Yes
EventTs	FB1812	5.0	No	Yes
Event16Ts	FB1887	5.0	No	Yes
FmCont	FB1818	9.3	No	Yes
FmTemp	FB1819	9.3	No	Yes
MonAnL	FB1845	5.3	No	Yes
MonAnS	FB1912	5.2	No	Yes
MonDi08	FB1847	5.2	No	Yes
MonDiL	FB1848	5.3	No	Yes
MonDiS	FB1913	5.1	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
Pcs7DiCnt	FB1935	9.3	No	Yes
Pcs7DilT	FB1872	9.3	No	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
TotalL	FB1906	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

The comment [Release 09.00.03.04] has been added for all changed blocks.

4.13 Version 9.0 SP3 Update 5

4.13.1 Changes in version 9.0 SP3 Update 5

- The manipulated variable limit outputs `MV_HiAct`, `MV_LoAct` at the **VlvAnL** block are now already set when the manipulated variable limit is reached.
- The **P component** at the controller block **PIDConR** is also taken into account for **calculating manipulated values** for values from `GAIN >= 100` Block **PIDCoefR** was adapted for this.

- At channel block **FbAnOu**, the behavior for invalid **input values** at `Rbk`, `RCasOut` and `PosD` can be configured using `Feature.Bit28`.
  `Feature.Bit28=1:`
  For an invalid input value, the corresponding outputs are tracked to an invalid input value (`RbkLi = Rbk`, `RCasOutLi = RCasOut`, `PosD_Li = PosD`)
  `Feature.Bit28=0:` (default setting at **FbAnOu** = previous behavior)
  for an invalid input value, the outputs are held and the respective status output set = 16#00.
- No monitoring errors can occur at the **motor valve VlvMotL** with deactivated **feedback monitoring** (`V_Monitor = 0`), even in operation without feedback (`NoFbkOpen=1`, `NoFbkClose=1`).
  After a control of the **motor valveVlvMotL**, the configuration settings are reset and the feedback output tracking is delayed if there is no feedback signal. After V_MonTiDynamic is executed, the valve end position is assumed to be reached and the motor is turned off.

4.13.2 Update Information for Version 9.0 SP3 Update 5

The following applies for the software update from version V9.0 SP3 Upd4 to 9.0 SP3 Upd5 :

1.	Close textual interconnections	**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	Code change
FbAnOu	FB1814	9.3	No	Yes
PIDCoefR	FC366	5.0	No	Yes
VlvAnL	FB1896	5.3	No	Yes
VlvMotL	FB1900	5.3	No	Yes

Note

The comment [Release 09.00.03.05] has been inserted in all changed blocks.

4.14 Version 9.0 SP3 Update 6

4.14.1 Changes in version 9.0 SP3 Update 6

- The **controller blocks**, **PIDConL, PIDConR, PIDStepL, PIDConS, FmCont, FmTemp** can now continue to be operated even if a #NaN process value is present. The block acts as a sink, thus ensuring that no #NaN values are passed on to outputs.
- At the **interlocking modules Intlk02**, **Intlk04**, **Intlk08**, **Intlk16** the Bypass commands and information at the interlock inputs BypLix.Value, Inx.Bit1 can now be used simultaneously per interlock input:
  Requirements:
  - BypLix <> 16#FF: Input BypLix must be connected
  - BypEn.Inx = 1: The bypass information in the interlock input must be switched effective as a bypass command.
  - Feature Bit2 =1: Separate evaluation of excluded and simulated interlock signals
  When changing BypLix.Value, Inx.Bit1 the Bypass is set according to "BypLix.Value OR Inx.Bit1". Only when both inputs are zero is the Bypass reset.
  Note: If **only** BypLix.Value shall be evaluated, the Bypass enable bit must be deactivated: BypEn.Inx.Value =0.
- The on-site operation with control tracking (LocalSetting =2, =4) with **VlvL** now also considers the "Deactivation of feedback messages (NoFbkOpen, NoFbkClose)" function.
- With valve feedback monitoring switched off (V_Monitor =0) the display in case of loss of valve position has been improved with **VlvMotL**.
- With **VlvMotL**, the behavior of non-resettable monitoring errors in manual mode (Feature Bit31 =0) has been improved.
- In the event of a monitoring error of the valve feedback signals with SafePos =2 the error is no longer reported twice with **VlvMotL**.
- With **PIDConR**, the SP_Load setpoint is limited to the limits SP_InHiLim, SP_InLoLim.

4.14.2 Update Information for Version 9.0 SP3 Update 6

The following applies for the software update from version V9.0 SP3 Upd5 to 9.0 SP3 Upd6 :

1.	Close textual interconnections	**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	Code change
FmCont	FB1818	9.3	No	Yes
FmTemp	FB1819	9.3	No	Yes
Intlk02	FB1824	5.3	No	Yes
Intlk04	FB1825	5.3	No	Yes
Intlk08	FB1826	5.3	No	Yes
Intlk16	FB1827	5.3	No	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
VlvL	FB1899	5.3	No	Yes
VlvMotL	FB1900	5.3	No	Yes

Note

The comment [Release 09.00.03.06] has been inserted in all changed blocks.

4.15 Version 9.0 SP3 Update 7

4.15.1 Changes in version 9.0 SP3 Update 7

- The display of the local commands in the preview view has been improved. For this, the calculation of `Status2 Bit19` is adapted at the **MotL, MotRevL, MotS, MotSpdCL, MotSpdL, Vlv2WayL, VlvL, VlvMotL, VlvPosL, VlvS** blocks.
  At the **DoseL** block, a new status bit has been defined:
  `Status3 Bit14`: 1 = Input signals have no impact on "Local mode" with LocalSetting = 0 and "Out-of-service" mode.
- The configurable reset response of the **MotRevL, ModSpdL, VlvMotL, VlvPosL** blocks has been improved when the "Protection" or "Motor protection" interlock via `Feature Bit19` is pending.
- The following improvements have been made to the **VlvAnL** block: Reliable detection of `PosReached` and avoidance of monitoring errors during operation without digital feedback (`NoFbkOpen` and `NoFbkClose=1`)

- The feedback monitoring and the reset response in the end positions have been improved at the **VlvMotL, VlvPosL** blocks.
  The monitoring error is not reset until it is triggered again, especially in the event of a monitoring error that does not require reset and plausible feedback `FbkXxx` with `SafePos =2`. This prevents the monitoring error from being present for only one cycle.
- Improved control response when deactivating the Stop command `OS_Perm.Bit4 =0` has been improved at the **VlvMotL** block.
- At the **ModSpdL** block, the intermediate position (Speed 1) for the elapse of the switchover time `SwOverTi` is only activated when the feedback `FbkSpd1` is also present. This improves the behavior in the event of incorrect operation in the intermediate position (Speed 1).
- At the **FbAnOu** block, the last valid value of `Rbk` is kept and the status is set to simulation `16#60` with an invalid raw value and `Feature.Bit31 =1`. This adapts the behavior to the **Pcs7AnIn** block.
- Setting invalid process values PV_LoAct, PV_HiAct and `Bad` at the range limits for symmetrical physical value ranges has been improved at the **Pcs7AnIn** block.
- Channel block **Pcs7AnOu**: The Simatic PDM Maintenance State MS=16#7xxx xxxx now only results in `Bad` for HART channels.

4.15.2 Update Information for Version 9.0 SP3 Update 7

The following applies for the software update from version V9.0 SP3 Upd6 to 9.0 SP3 Upd7 :

1.	Close textual interconnections	**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	Code change
DoseL	FB1809	9.3	No	Yes
FbAnOu	FB1814	9.3	No	Yes
MotL	FB1850	9.3	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
Pcs7AnIn	FB 1869	9.3	No	Yes

Pcs7AnOu	FB 1870	9.3	No	Yes
Vlv2WayL	FB1897	5.3	No	Yes
VlvAnL	FB 1896	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

The comment [Release 09.00.03.07] has been inserted in all changed blocks.

4.16 Version 9.0 SP3 Update 8

4.16.1 Changes in version 9.0 SP3 Update 8

- When **changing the control direction to an interlocked direction**, you can select as from this version the control response for the **MotRevL, MotSpdL, VlvAnL, VlvMotL, VlvPosL** blocks via a feature bit:
  Feature2 Bit14: **Stop position when the control direction changes to a locked direction**
  For the direction/speed-dependent **locking function** (`Feature2 Bit16 = 1`), you can use this feature bit to set the control behavior after a command change from a direction/speed to a locked direction/speed.
  The default setting is 0.
  Bit = 0: The drive continues to run in the current direction / at the current speed.
  Bit = 1: The drive changes to the Stop position.

  Note

  With the introduction of `Feature2 Bit14`, the standard behavior of the motor valve **VlvPosL** with position control switched on was also adapted to the standard behavior of the blocks **VlvMotL, MotRevL, MotSpdL** and **VlvAnL**.

  PREVIOUSLY:
  When the command direction is **changed to a locked direction**, the motor valve moves to the stop position when position control is active. The operator setpoint is updated `MV_Out = RbkOut`.
  NEW:
  With `Feature2 Bit14 =0` (default setting), the actuator continues to run with the current control value output.

NOTICE
As a result of harmonization, there is a change in behavior for the VlvPosL. **If you want to retain the previous behavior of the block, you must set the** `Feature2 Bit14` **to** `1` **when upgrading.**

- Improved **control response** when deactivating the Stop command `OS_Perm.Bit4 =0` has been improved at the **VlvPosL** block.
- The **measuring point browser** now only displays "Suppressed messages" if the **AV** block is connected to the drive modules.
- At the **PIDConL, PIDConS, PIDConR, PIDStepL, FmCont, FmTemp** blocks, a parameterization `DiffGain <1` or `DiffGain >10` does no longer lead to an **error indication** at the output `ErrorNum =62` when the **D-component** (`DiffSel =0, TD =0`) is switched off.

4.16.2 Update Information for Version 9.0 SP3 Update 8

The following applies for the software update from version V9.0 SP3 Upd7 to 9.0 SP3 Upd8 :

1.	Close textual interconnections	**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	Code change
FmCont	FB1818	5.3	No	Yes
FmTemp	FB1819	5.3	No	Yes
MotL	FB1850	5.3	No	Yes
MotRevL	FB1851	5.3	No	Yes
MotSpdCL	FB1854	5.3	No	Yes
MotSpdL	FB1856	5.3	No	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
VlvAnL	FB 1896	5.3	No	Yes
VlvMotL	FB1900	5.3	No	Yes
VlvPosL	FB1918	5.3	No	Yes

Note

The comment [Release 09.00.03.08] has been inserted in all changed blocks.

4.17 Version 9.0 SP3 Update 9

4.17.1 Changes in version 9.0 SP3 Update 9

- At the **MotSpdL** block, the switchover behavior via Speed 1 (SwiOverTi >0.0, Feature Bit5 =1) with set direction-dependent interlocking has been improved.
- At the **VlvPosL** block, the monitoring behavior of the valve feedback with control in the minimum pulse duration phase `Breaktime` has been improved.
- Correction at the block **FbEnMe** when calculating the output parameters PL1Li, PL2Li, PL3Li, PLTotLi, AcPwrLi, RePwrLi, ApPwrLi.
- Improvement at the **Pcs7AITC** channel block to prevent toggling of the Bad output parameter with Feature.Bit29=1 (substitute value)
- Robustness measure at **PCS7AnIn** so that an incorrect process value does not result with measuring ranges other than 4..20mA NamurOff=1.
- **Event16Ts** has been improved to display the batch name for all 16 messages.

4.17.2 Update information for Version 9.0 SP3 Update 9

The following applies to the software update from version V9.0 SP3 Upd8 to 9.0 SP3 Upd9 :

1.	Close textual interconnections	**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	Code change
FbEnMe	FB1908	9.3	No	Yes
MotSpdL	FB1856	5.3	No	Yes
Pcs7AITC	FB1933	9.3	No	Yes
Pcs7AnIn	FB1869	9.3	No	Yes
VlvPosL	FB1918	5.3	No	Yes
Event16Ts	FB1887	5.0	No	Yes

Note

The comment [Release 09.00.03.09] has been inserted in all changed blocks.

Information on configuration and operation 5

- 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**. If the module supplies the **QI information**, the "Generate device driver" CFC function connects the input parameter `ProImQB` with the corresponding symbol and sets the input parameter `SelQB` to "1".
- **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.
- **Channel blocks**
  - `Feature` input:
    To prevent double configurations, specific Feature bits are automatically parameterized by the **PCS 7 driver generator** during CFC compilation with the function "Create module driver" on the basis of the settings made in the hardware configuration. For this reason, the `Feature` parameter **must not** be interconnected. Otherwise, any existing interconnections could be deleted.
  - Input `SelQB`:
    If the block provides **quality information (QI)** in the process image, the `SelQB` input is configured with a "1" by the **PCS 7 driver generator** and the `ProImQB` input is connected to the corresponding QI symbol. With **I/O redundancy**, the `ProImQBSlv` input is additionally connected to the symbol of the redundant QI.

- 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 (`FeatureBit 29 =1`) and "last saved value" was selected for the startup characteristics (`FeatureBit 0 =1`), the limit violation messages are triggered after a complete download of the user program.
- If you are using a Pcs7AnOu channel block and a **MultiHART** channel block Pcs7HaAO for the same analog output channel (interconnection to PV_Out) at the same time, make sure that the cyclic interrupt OB3x for Pcs7HaAO is called before the Pcs7AnOu in the run sequence.
- When configuring Feature2 Bit3=1 **"Control priority for an invalid and implausible input command"** on the **MotRevL** and **MotSpdCL** motor blocks, note that in automatic and local mode (LocalSetting =1/3) a direct change of direction is also possible with Feature Bit7 =0. If a command is given in the opposite direction, the motor first goes to stop and thereby returns to a plausible state. Then, the motor changes to the opposite direction. The configured enable time IdleTime is maintained in any case.
- For the controllers **PIDConL**, **PIDConR** and the motor block **MotSpdCL**, the function **"Delay alarm for system deviation with setpoint steps"** (ER_AL_DFac, ER_AH_DFac >0) only works for the limit in the direction of the setpoint step. If the system deviation exceeds the opposite limit when the process value overshoots, the configured ON delay ER_A_DC or ER_AH_DC takes effect.
- During **time synchronization via NTP** the block works **TimeTrig** internally always with the UTC time. There is no daylight saving time identifier and the input of "LocalTime" has no effect with time synchronization via NTP.
- The `Gain` parameter must not be parameterized `>100` at the **PIDConR** block. Using the scaling factors `NormPV`, `NormMV`, it is possible to set the effective controller gain `GainEff` so that a controller gain at `Gain >100` is not necessary.
- If motor starters which support hardware interrupts are used and if only the APL channel block **FbSwtMMS** is used, the associated hardware interrupts such as OB40 should be deactivated for these devices in order to avoid error messages and unnecessary CPU load.
- If the time stamp of the I/O is to be used with `TimeStampOn` = 1 set for an **EventTS** instance, it must be ensured that `Feature.Bit5 = 0` is used for all connected **Pcs7DiIT** channel blocks. Otherwise, the **time stamping** will not work reliably for this EventTS instance.
- When the auxiliary valve is closed, the **position feedback** `Rbk` is not monitored for the limits `RbkWH, RbkWL` at the **VlvAnL** block. The `RbkWH_Act, RbkWH_Act` outputs are reset.

Notes on the documentation

6

- 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: The device infeed or inverted enable is also activated when starting in forward or reverse. 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#x5xxxxx) 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#x5xxxxx) 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 information that the simulation value is specified in counting mode by means of input parameter `SimPV.Value` is missing in the "Simulation of signals" section of the "**Functions of Pcs7DiCnt**" chapter. 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*

- The following note must be amended in the section "**Feedback monitoring**":
  - OLD: *In manual mode, you can control all valves (including the motor valve, even at MonSafePos = 1) and with "End position error", even without reaching the neutral position*.
  - NEW: *In manual mode with disabled reset function (Feature Bit 31 =0), you can control all valves (including the motor valve, even at MonSafePos = 1) and with a pending feedback monitoring error, even without reaching the neutral position*.

- In the section "**Manual and automatic mode for controller blocks**" the following sentence must be changed in the paragraph **Switchover using interconnection (CFC or SFC instance)**:
  - OLD: *If both signals (*`ManModLi` *=1,* `AutModLi` *= 1) are set,* `ManModLi` *= 1 has priority*.
  - NEW: *If both signals (*`ManModLi` *=1, and* `AutModLi` *= 1) are set, the previous operating mode is retained and* `ErrorNum` *outputs the error number 51*.
- In the section "**Descriptions of PIDConL** / **PIDConR**", the description for `Bit31` is missing in the **status word** `Status1`.
  `Status1` `Bit31` "Bypass at upstream interlock block active"
- For section "**Functions of MonAnL**" subsection **Gradient monitoring**:
  The slope or gradient `PV_degree` of the process value is calculated in units per second, per minute, or per hour, depending on the configuration of the `TimeFactor`:
  - `TimeFactor` = 0: The unit of gradient limitation is Unit/**Second**
  - `TimeFactor` = 1: The unit of gradient limitation is Unit/**Minute**
  - `TimeFactor` = 2: Unit of gradient limitation is Unit/**hour**

  The limits `GradHUpLim`, `GradHDnLim` and `GradLLim` must be entered in units per second, per minute or per hour, according to the configuration of the `TimeFactor`. Reaching or exceeding the limits can be indicated and signaled at the corresponding outputs:
  ```
  GradLAct = GradLLim <= PV_Grad <= PV_Grad
  GradHupAct = PV_Grad >= GradHUpLim
  GradHDnAct = PV_Grad <= GradHDnLim
  ```
- In the sections "**Forcing operating states in "Local" mode**" and "**Forcing operating states**", there is no information that forcing in the **local mode** is only possible
  with `LocalSetting` = 1 and `LocalSetting` = 3

- In the section "**Description of STRep**", the term "**operating state**" used in the note must be replaced with "**Operating State**".

  The note then reads as follows:

  *The output QSTATE has the attribute S7_enum := **"Operating State"**. You can use the enumeration **"Operating State"** in the "Shared Declarations" folder of your project to define the text for the enumeration value. If you want to use your own enumeration, you must adapt the attribute S7_enum at the output QSTATE.*

- Chapter "**Status word of FbSwtMMS**"
  The status word assignment is as follows:
  ```
  Bit 0 FdkRev
  Bit 1 FdkOff
  Bit 2 FdkFwd
  Bit 3 OverlAct
  Bit 4 LockTmAct
  Bit 5 FdkAuto
  Bit 6 ErrAct
  Bit 7 WarnAct
  Bit 8 Status8
  Bit 9 Status9
  Bit 10 ManSpcO5
  Bit 11 ManSpcO6
  Bit 12 ManSpcO1
  Bit 13 ManSpcO2
  Bit 14 ManSpcO3
  Bit 15 ManSpcO4
  ```

- **"Description of TimeTrig**"
  The DailyOn, WeeklyOn and MonthlyOn inputs mentioned in the text are not available on the block for the selection of the periodic trigger. The selection of the periodic trigger is realized using the PerMode input.
  `PerMode=0` no periodic trigger
  `PerMode=1` daily periodic trigger
  `PerMode=2` weekly periodic trigger
  `PerMode=3` monthly periodic trigger

- The following information is missing in the **Area of application for Pcs7AnIn** section of the "Description of Pcs7AnIn" chapter:
  You can use the block to record temperatures in °C and °F. Kelvin is not supported.
  The following paragraph must be amended in the "**Configuration**" section of the "**Description of Pcs7AnIn**" chapter:
  If you use the block for **temperature measurement** and the `Mode` input has been connected by the driver generator, the unit at the `PV_InUnit` input is automatically set to the code 1001 (°C) or 1002 (°F) by the block depending on the hardware configuration.

- In chapter "**Description of VlvMotL**" and in chapter "**Description of VlvPosL**", the meaning of status bits 24 and 25 around status word 1 is as follows:
  `Status1.Bit24:`
  0 = "Closed" display for displaying the neutral position in the standard view when SafePos `= 0 or 2` 1 = "Open" display for displaying the neutral position in the standard view when `SafePos` = 1 or 2
  `Status1.Bit25:`
  1= "Intermediate position" display for displaying the neutral position in the standard view when `SafePos` = 2
- In chapter "**Description of VlvAnL**", the meaning of status bits 3, 4 and 5 around status word 2 is as follows:
  `Status2.Bit3:` 1 = "Open" display for displaying the neutral position in the standard view when `SafePos` = 1 or 2
  `Status2.Bit4:` 1 = "Closed" display for displaying the neutral position in the standard view when `SafePos` = 0 or 2
  `Status2.Bit5:` 1= "Intermediate position" display for displaying the neutral position in the standard view when `SafePos` = 2
- In the section "**Motor with PROFIdrive Drive Profile telegram 1 and 20 (Namur)**", the following sentence is missing after the first section:
  The **MotSpdCL** block is prepared for local mode with `LocalMode=4`. If required, you need to connect the local commands with the corresponding block inputs `xxxLocal`.
- In the section "**Set startup characteristics**" `Feature Bit0` the following is missing:
  Defining the startup characteristics for dosing block DoseL
  `Bit =0`: At startup, the dosing is switched to manual mode and to the "End" state. The block is reset based on the specified input values.
  For example, the dribbling quantity `DribbOut` is set to zero when the learn function is activated and to `DribbIn` when the learned function is deactivated:
  `DribbCorr =1: DribbOut =0.0`
  `DribbCorr =0: DribbOut =DribbIn`
  `Bit =1`: At startup (without complete download), dosing is continued with the values in the instance DB before the AS stop.
  For example, the learned dribbling quantity can continue to be used in the `DribbOut` output.

Note

After a complete download with AS stop and `Feature Bit0 =1`, the learned `DribbOut` dribbling quantity in the OB100 run is also first reset to zero and then reset to the `DribbIn` input depending on `DribbCor`.

Messages can be suppressed for a short time after startup. You can set the number of cycles using the input parameter `RunUpCyc`.

- In the section "**MotSpdL functions** in the paragraph **Switching off via Speed1**", the following sentence is missing under the table:
  The **Switching on or off via Speed1** functions only take effect after the time `SwOverTi >= SampleTime`.
- To chapter "**Description of** FbDrive section **Working method**:
  - OLD: The FbDrive block integrates any compact drives that meet the following conditions and are recognized by the system:
    - Frame type "1" with 2 input words and 2 output words
    - Frame type "20" with 6 input words and 2 output words
  - NEW: The FbDrive block integrates all compact drives (or drives with user-defined submodules distributed over more than one slot) that meet one of the following conditions and are recognized by the system:
    - Frame type "1" with 2 input words and 2 output words
    - Frame type "20" with 6 input words and 2 output words

Change history of PCS 7 Advanced Process Library 7

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

Version	Edition	Change
2019 FEB 02 (ONLINE)	02/2019	Delivery status PCS 7 Advanced Process Library V9.0 SP3
2019 SEPT 10 (ONLINE)	09/2019	Delivery status PCS 7 Advanced Process Library V9.0 SP3 Update 1
2020 JAN 31 (ONLINE)	01/2020	Delivery status PCS 7 Advanced Process Library V9.0 SP3 Update 2
2020-04-20 (ONLINE)	04/2020	Delivery status PCS 7 Advanced Process Library V9.0 SP3 Update 3
2020-11-17 (ONLINE)	11/2020	Delivery status PCS 7 Advanced Process Library V9.0 SP3 Update 4
2021-03-03 (ONLINE)	03/2021	Delivery status PCS 7 Advanced Process Library V9.0 SP3 Update 5
2021-07-21 (ONLINE)	07/2021	Delivery status PCS 7 Advanced Process Library V9.0 SP3 Update 6
2021-02-03 (ONLINE)	02/2022	Delivery status PCS 7 Advanced Process Library V9.0 SP3 Update 7
2022-09-13 (ONLINE)	09/2022	Delivery status PCS 7 Advanced Process Library V9.0 SP3 Update 8
2023-09-29 (ONLINE)	09/2023	Delivery status PCS 7 Advanced Process Library V9.0 SP3 Update 9