



SIMATIC

**Process Control System PCS 7
PCS 7 Advanced Process Library
Readme V8.2 SP1 Update 1 (online)**

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 DANGER
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indicates that minor personal injury can result if proper precautions are not taken.
NOTICE
indicates that property damage can result if proper precautions are not taken.

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

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Security information

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Overview

Note

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

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

Notes on installation

3.1 Scope of delivery

The scope of delivery includes the following library:

- PCS 7 Advanced Process Library V8.2 SP1

3.2 Hardware requirements

The installation is subject to the conditions of SIMATIC PCS 7 V8.2.

3.3 Software requirements

The blocks of the library require at least SIMATIC PCS 7 V8.2.

3.4 Installing the PCS 7 Advanced Process Library

Exit all applications before you start setup.

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

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 V82".

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

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

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

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

3.4 Installing the PCS 7 Advanced Process Library

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 8.2

4.1.1 What's new in Version 8.2?

- Reduction of the memory consumption of the **MotRevL**, **MotSpdCL** and **MotSpdL** blocks
The following points are to be considered with regard to TCiR (type changes in runtime):
 - New control commands must not be initiated during the TCiR process
 - New reset commands should not be initiated during the TCiR process
- New channel block **FbEnMe** for support of the ET 200SP Energy Meter module
- New **VlvPosL** block for controlling a motor valve with analog position feedback
- New **ShrdResL** block.
Unlike **ShrdResS**, strategies for channel allocation can be specified.
- New parameter **LocalTime** in the **TimeTrig** block for using the local time zone while taking into account the daylight savings / standard time
- Transfer of values from Condition Monitoring functions for the PCS 7 maintenance station via the channel blocks.
- Transfer of the maintenance release from the channel blocks to the PCS 7 maintenance station.
- New Feature Bit in the **DoseL** block to prevent overdosing does not automatically go to the "End" state but instead first goes to the "Off" state. The state "End" is only reached by acknowledging the overdosing or draining.
- Maintenance status (MS input) is provided at the **MS_Dev** output of the channel block for further processing in the program.
- Messages for the setpoint difference in the **MotSpdCL** block may be delayed via **ER_A_DC** / **ER_A_DG**.
- Behavior can be changed when changing the ramp target in active ramp travel with **PIDConL**, **PIDConR**, **PIDStepL**, **FMTemp**, **FMCont**, **MotSpdCL**, **OpAnL** blocks (Feature Bit 6) and **VlvAnL** (Feature Bit 7)

4.1 Version 8.2

- Error number 51 is output for invalid input signals in the family Control blocks analogous to the blocks of the Drives family.
- New **AbsR** block for the formation of the absolute value function of a real number.
- The **VlvAnL** block also monitors the analog feedback in the intermediate position ($\text{PosDiClose} < \text{RbkOut} < \text{PosDiOpen}$).
The block can now also be operated without analog position feedback (**Rbk**).
The **Rbk.ST** parameter must have the value 16#FF for this.
- To prevent the manipulated variable from remaining in the limit range for too long with large **TI** values with the **PIDConR** module following a switchover to automatic mode, it is possible to accelerate the return of the integral action from the limit via the new Feature bit 17. The integral action is hereby moved in the direction of the control range just far enough for the manipulated variable to remove itself quickly and smoothly from the manipulated variable limits (**MV_HiLim**/**MV_LoLim**) when a control deviation is pending.

4.1.2 Changes in version 8.2

- Feature Bit 6 was set to form the control word in case of error at the **FbDrive** block. The feature bit is set to "1" by default.
All input parameters are thus passed unchanged to the **PZDOut1** output. If Feature Bit is = 0, the motor is deactivated.
- In the **VlvMotL**, **MotL**, **MotRevL**, **MotSpdCL** and **MotSpdL** blocks, the lockout (**IdleTime**) is not started in the operating modes Automatic and Manual until the "Stop" feedback is present.
- With a bad signal state at the **TorqClose** input and an activated "Seal valve" function in the **VlvMotL** block, the valve now appears to be stopped instead of closed rather in the block icon and faceplate.
- If control and feedback signals in the **Vlv2WayL** block match with invalid input commands for forcing operating states (**xxxForce**), a monitoring error occurs despite reset.
- In the **MotL**, **MotRevL**, **MotSpdCL**, **MotSpdL**, **VlvL**, **VlvMotL**, **VlvAnL** and **DoseL** blocks, and with invalid input commands for forcing operating states (**xxxForce**), the button for the controls in the faceplate is not operational in the manual mode.
- In manual mode the **VlvAnL** block can control the valve also with "End position error" even without reaching its neutral position.
- After a **V_MonTiStatic** monitoring error due to an inability to maintain the neutral position in the **VlvMotL** block, the **V_MonTiDynamic** monitoring is restarted by a renewed drive to the neutral position.
- In German, the term "Wartung..." has been replaced with "Instandhaltung..." in the message texts in the **AssetM** block.
- No repetitive loading of the elapsed monitoring period for maintaining the position in the simulation mode and **NoFbkOpen**=1 / **NoFbkClose**=1 in the **VlvAnL** block.
- The monitoring error in the **Vlv2WayL** block with the settings **LocalSetting** = 4 (internal tracking of feedback) and Feature Bit 12 = 1 (position feedback signals active) and invalid position feedback signals remain active until the position feedback signals are valid.

- The `Spd1ChnST/Spd2ChnST` inputs have been integrated in the process tag types **Motor2Speed**.
- If the internal setpoint in the **OpAnL**, **MotSpdCL**, **VlvAnL**, **ModPreCon** and **MPC10x10** blocks is limited with an adjustment of the setpoint limits, the input for the internal setpoint is also tracked. Jumps in the internal setpoint can thus be avoided when setting the setpoint limits to the original value again. This means the blocks react the same as other blocks of the Control and Dosage family.
- In the **MeanTime** block the function "Set fixed mean value" is corrected via the `Reset` input. The value of the `In` input is now permanently routed to the `Out` output and not only for one cycle.
- If after control in the block **VlvMotL** an opposite feedback message of the valve occurs while `V_MonTiStatic` is running, this control is no longer accepted. Monitoring for maintenance of the position is started.
- In the **MotL**, **MotRevL**, **MotSpdL**, **MotSpdCL** and **VlvMotL** blocks a change to the `IdleTime` while the `IdleTime` is already running is immediately applied and the time already elapsed is taken into account.
- The operator control enable for opening, closing and stopping in the **VlvMotL** block with simultaneous pending valve feedback signals have been corrected.
- A protective interlock for a direction (with Feature 2 bit 16 = 1) is no longer reset in the **MotRevL** block when driving in the opposite direction.
- In the family of blocks Dosage and drives, there is no longer a switchover at startup of the AS (OB100) to manual operating mode from the operating mode out of service.
- The **PIDConL** block with configured deadband and simultaneous "Proportional action in feedback path" no longer generates a manipulated variable jump within the deadband.
- After installing the **ModPreCon** or **MPC10x10** block and configuring the DB number for controller data, the controller data now take effect immediately with `Restart = 1`.
- The stop pulse signal `P_Stop` at the **VlvMotL** block is now also within the pulse width `PulseWith`. The device behaves like all the other valves and motors.
- If one of the valve feedbacks is absent (`NoFbkOpen = 1` or `NoFbkClose = 1`) and the other incorrect, the **VlvMotL** now block detects the `V_MonTiStatic` monitoring error by the missing adherence to the neutral position.
- The limitation of the analog signal increase `In.Value` at the block **RateLim** now functions with twice the accuracy.

4.1 Version 8.2

- In the **PIDConR** block, the control behavior on switchover to automatic has been optimized. For this purpose, the limit of the integral action has been set to the maximum range from -10000% to +10000% in the **PIDKernR** block. This guarantees smooth switchover from manual to automatic mode when a control deviation is present. To prevent the manipulated variable from remaining in the limit range for too long with large TI values, it is possible to accelerate the return of the integral action from the limit via Feature bit 17. The integral action is hereby moved in the direction of the control range just far enough for the manipulated variable to remove itself quickly and smoothly from the manipulated variable limits (MV_HiLim/MV_LoLim) when a control deviation is pending.
- With interlocking the **PIDConL** and **PIDConR** blocks now behave like closed-loop controllers with an open control loop (cf. for example manual operation or tracking). Setpoint tracking is therefore also active and the outputs `LoopClosed`, `CascaCut` are set accordingly. When leaving interlocking the manipulated variable behaves smoothly if Feature Bit 18 = 0 is set.

4.1.3 Update information for version 8.2

The following applies to the software update from version 8.1.x to version 8.2:

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

Note

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

"Type import - Changed default value" dialog box

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

List of changed blocks

Name	Number	Block version	Interface change (AS STOP is not necessary if a CPU 410-5H with TCiR is used)	Code change
CntOhSc	FB1803	4.0	Yes	No

ConPeMon	FB1805	4.0	Yes	No
CountOh	FB1864	4.0	Yes	No
CountScL	FB1806	4.0	Yes	No
DoseL	FB1809	4.0	Yes	Yes
FbAnIn	FB1813	8.7	No	Yes
FbAnOu	FB1814	8.7	No	Yes
FbAnTot	FB1817	8.7	No	Yes
FbDiIn	FB1815	8.7	No	Yes
FbDiOu	FB1816	8.7	No	Yes
FbDrive	FB1905	8.7	No	Yes
FbSwtMMS	FB1907	8.7	No	Yes
FmCont	FB1818	4.0	Yes	Yes
FmTemp	FB1819	4.0	Yes	Yes
GainSche	FB1820	4.0	Yes	Yes
Limit	FB1829	4.0	Yes	No
MeanTime	FB1832	4.0	No	Yes
ModPrCon	FB1843	4.0	No	Yes
MonAnL	FB1845	4.0	Yes	No
MotL	FB1850	4.0	Yes	Yes
MotRevL	FB1851	4.0	Yes	Yes
MotS	FB1910	4.0	No	Yes
MotSpdCL	FB1854	4.0	Yes	Yes
MotSpdL	FB1856	4.0	Yes	Yes
MPC10x10	FB1920	4.0	No	Yes
OpAnL	FB1865	4.0	No	Yes
OpDi01	FB1866	4.0	Yes	No
OpDi03	FB1867	4.0	Yes	No
Pcs7AnIn	FB1869	8.7	No	Yes
Pcs7AnOu	FB1870	8.7	No	Yes
Pcs7Cnt1	FB1833	8.7	Yes	Yes
Pcs7Cnt2	FB1834	8.7	Yes	Yes
Pcs7Cnt3	FB1835	8.7	Yes	Yes
Pcs7DiIn	FB1871	8.7	Yes	Yes
Pcs7DiIT	FB1872	8.7	Yes	Yes
Pcs7DiOu	FB1873	8.7	Yes	Yes
PIDConL	FB1874	4.0	No	Yes
PIDConR	FB1875	4.0	No	Yes
PIDConS	FB1830	4.0	No	Yes
PIDStepL	FB1878	4.0	No	Yes
RateLim	FB1882	4.0	No	Yes
SelA16In	FB1888	4.0	Yes	No
TimerP	FB1810	4.0	Yes	No
TimeTrig	FB1802	4.0	Yes	Yes
Trigger	FB1821	4.0	Yes	No

4.2 Version 8.2 SP1

TotalL	FB1906	4.0	Yes	No
Vlv2WayL	FB1897	4.0	No	Yes
VlvAnL	FB1896	4.0	Yes	Yes
VlvL	FB1899	4.0	No	Yes
VlvMotL	FB1900	4.0	Yes	Yes
VlvS	FB1911	4.0	No	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", only the interfaces were prepared for a future function.

4.2 Version 8.2 SP1

4.2.1 What's new in Version 8.2 SP1?

- The block **ShrdResL** has been expanded from 4 to 8.
- The block **MonAnL** has the ability to smooth the process value PV via a low pass filter of the first order. The smoothing constants are configured at the parameter `SmoothTi` in the parameter view.
- The block inputs `PropFacSP` (P component in feedback) and `DiffToFbk` (D component in feedback) are mapped and can be configured in the parameter view at the blocks **PIDConL**, **PIDConR**, and **PIDConS**.
- You can use the Feature Bit 6 at block **SelA16In** and the inputs `LiOp`, `SelIntOp`, `SelExtOp`, `SelIntLi` and `SelExtLi` to realize an internal / external switchover which can also be switched via the faceplate.
- The blocks **TimerP**, **FlipFlop**, **Trigger**, **OpDi01**, **OpDi03** and **Limit** now have defined startup characteristics following a CPU stop.
- The blocks **MotRevL**, **MotSpdSL**, **MotL**, **VlvMotL**, **VlvPosL** support a second `EventTs` or `EventTs16` at the input `EventTs2In`.

4.2.2 Changes in version 8.2 SP1

- In the blocks **MotL**, **MotRevL**, **MotSpdL**, **MotSpdCL**, **VivL**, **Viv2WayL**, **VivAnL**, **VivMotL** and **VivPosL** the interlock of the release first becomes effective when the corresponding feedback message is in idle state.
- The setpoint limits are now taken into account during setpoint tracking ($SP_TrkPV = 1$ or $SP_TrkExt = 1$) for the following controller blocks: **PIDConL**, **PIDConS**, **PIDStepL**, **PIDConR**, **FmCont** and **FmTemp**.
- The controller behavior has been improved in the case of a partial placement of the P component in the feedback ($0 < PropFacSP < 1$) at the blocks **PIDConL**, **PIDStepL** and **PIDKernR** (subfunction of the **PIDConR**). The improvement is most noticeable for $PropFacSP = 0.5$.
- The OS area has been corrected to **\$\$AREA\$\$** in the message configuration at block **VivPosL**.
- The blocks **MotL**, **MotS**, **MotRevL**, **MotSpdCL**, **MotSpdL**, **VivL**, **VivS**, **VivMotL**, **VivAnL**, **Viv2WayL** and **VivPosL** now have uniform startup characteristics following a CPU stop when there are existing monitoring errors.
- At block **PIDConS**, the release for maintenance can now also be operated from the operating mode "Out of service".
- At block **Viv2WayL**, the static monitoring of feedback messages is also active during processing of warning times for controls.
- In simulation mode, the display for reaching the valve position at output **PosReached** and the operability of the manipulated variable and readback value at **Localsetting 2/4** and switch on release have been improved for block **VivAnL**.
- The change date of block **GainSched** has changed due to the modification of the contained block **OpDi01**. This is not associated with any functional change to the block **GainSched**.

4.2.3 Update information for version 8.2 SP1

The following applies to the software update from V8.2x to version 8.2 SP1:

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

List of changed blocks

Name	Number	Block version	Interface change (AS STOP is not necessary if a CPU 410-5H with TCiR is used)	Code change
FlipFlop	FC389	4.1	No	Yes
FmCont	FB1818	8.8	No	Yes
FmTemp	FB1819	8.8	No	Yes
GainSched	FB1820	4.1	No	Yes
Limit	FB1829	4.1	No	Yes
MonAnL	FB1845	4.1	No	Yes
MotL	FB1850	4.1	No	Yes
MotRevL	FB1851	4.1	No	Yes
MotS	FB1910	4.1	No	Yes
MotSpdCL	FB1854	4.1	No	Yes
MotSpdL	FB1856	4.1	No	Yes
OpDi01	FB1866	4.1	No	Yes
OpDi03	FB1867	4.1	No	Yes
PIDConL	FB1874	4.1	No	Yes
PIDConR	FB1875	4.1	No	Yes
PIDConS	FB1830	4.1	No	Yes
PIDKernR	FB1877	4.1	No	Yes
PIDStepL	FB1878	4.1	No	Yes
SelA16In	FB1888	4.1	No	Yes
ShrdResL	FB1917	4.1	No	Yes
TimerP	FB1810	4.1	No	Yes
Trigger	FB1821	4.1	No	Yes
Vlv2WayL	FB1897	4.1	No	Yes
VlvAnL	FB1896	4.1	No	Yes
VlvL	FB1899	4.1	No	Yes
VlvMotL	FB1900	4.1	No	Yes
VlvPosL	FB1918	4.1	No	Yes
VlvS	FB1911	4.1	No	Yes

4.3 Version 8.2 SP1 Update 1

4.3.1 Changes in version 8.2 SP1 Update 1

- The following blocks have been modified for the update of the Batch parameters at EventTs or Event16Ts for output to the technological blocks in WinCC: **DoseL**, **FmCont**, **FmTemp**, **MonAnL**, **MonDi08**, **MonDiL**, **PIDConL**, **PIDConR**, **PIDStepL**, **Vlv2WayL**, **VlvAnL** and **VlvL**.
- For functions "Set the count value to the default setting" and "Reset counter to zero" in block **CountScL**, the status of the output OutST can now be set to good (16#80).
- Following the reset of an interlock or when forcing operating modes (OpenForce, CloseForce) at **VlvAnL** in automatic mode, **OpenAut** and **CloseAut** can now be directly applied.
- During simulation mode for **MotSpdCL**, the behavior was changed so that when the power to the device is switched off that the controller also goes into STOP. This means that the simulation mode now behaves in the same way as normal mode.
- The calculation of the limit value signals for the disturbance variables FFwdHiAct and FFwdLoAct have been corrected for **PIDConL** and **PIDStepL**.
- The Alarm8p call for the switching points ER_AH_Act, ER_AL_Act, RbK_WH_Act and RbK_WL_Act are also initialized at startup for **VlvPosL**. This means that struck-through messages are avoided when these signals occur for the first time following CPU restart.
- During post-dosing at **DoseL**, the block now also goes to the End state before the post-dosing time has elapsed if the dosing setpoint is reached.
- In simulation mode of **VlvAnL**, the Simulation status (16#60) is now shown at output MV.

4.3.2 Update information for version 8.2 SP1 Update 1

The following applies to the software update from V8.2.1 to version 8.2.1 Update 1:

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

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
FB1806	CountScL	3.0	No	Yes
FB1809	DoseL	4.0	No	Yes
FB1818	FmCont	8.8	No	Yes
FB1819	FmTemp	8.8	No	Yes
FB1845	MonAnL	4.1	No	Yes
FB1847	MonDi08	4.0	No	Yes
FB1848	MonDiL	4.0	No	Yes
FB1854	MotSpdCL	4.1	No	Yes
FB1874	PIDConL	4.1	No	Yes
FB1875	PIDConR	4.1	No	Yes
FB1878	PIDStepL	4.1	No	Yes
FB1897	Vlv2WayL	4.1	No	Yes
FB1896	VlvAnL	4.1	No	Yes
FB1899	VlvL	4.1	No	Yes
FB1918	VlvPosL	4.1	No	Yes

Note

The comment [Release 08.02.01.01] has been inserted in all changed blocks.

Information on configuration and operation

- The **blocks in the library** have been designed exclusively for **S7-400** automation systems and are not suitable for the configuration of failsafe applications.
- For **AS blocks** that include ALARM_8P blocks:
Only the data types BOOL (not permitted: bit array), BYTE, CHAR, WORD, INT, DWORD, DINT, REAL, DATE, TOD, TIME, S5TIME, DATE_AND_TIME, COUNTER, TIMER are permitted. 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 the CPU 410 PA SMART, the minimum scan cycle time of OB1 is permanently set to 200ms.
- 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 new 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 user defined data types (UDT) from 1 to 50 are reserved for APL.
- 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.
- The use of different channel block types for the same drive or frequency converter device type is not permitted.
- 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.

- The use of different channel block types for the same drive device type or frequency converter is not permitted.

Notes on the documentation

- The terms or message classes Alarm, Warning, Tolerance or the corresponding acronyms in icons and colors used in the documentation are not valid when using user-configured message classes.
These terms and colors depend on the project-specific setting.
The user-configured alarm classes are only supported by block icons from the template pictures "@PCS7TypicalsAPLV8.PDL" or template "@TemplateAPLV8.PDL" .

Change history of PCS 7 Advanced Process Library

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

Version	Edition	Change
2016-06-02 (ONLINE)	03/2016	Delivery state PCS 7 Advanced Process Library V8.2 SP1

