SIEMENS

Ingenuity for life

Advanced Process Library for SIMATIC PCS 7

Future-proof and efficient plant engineering

siemens.com/pcs7

In today's process industry, standardization and modularization are the keys to more efficient plant engineering. The Advanced Process Library (APL) for the SIMATIC PCS 7 distributed control system minimizes the efforts, risks – and, ultimately, the costs – associated with designing and implementing an automation project. Developed to meet the user requirements, APL offers standardized modules for process control and visualization that combine the knowledge of experienced project engineers and plant operators with current NAMUR recommendations and PNO specifications. You benefit from faster project planning times, lower engineering and maintenance expenses, and a DCS that's primed for future upgrades.

Advanced Process Library – Make control more efficient

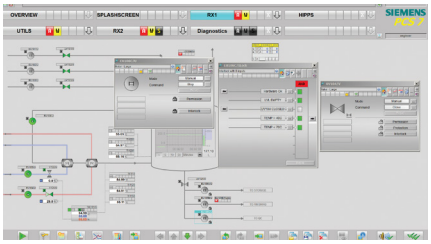
The Advanced Process Library, offered as a standard feature of SIMATIC PCS 7, includes pre-configured and pre-tested function blocks, faceplates and block icons for simplified, graphically based control of all process equipment. APL's comprehensive and flexible range of modules includes options for mathematical operations, control logic, motors, valves, field devices, monitoring, diagnostics and more.
With its high degree of standardization, clearly organized libraries and exceptional ease of use, APL lowers the overall life cycle costs of a plant in multiple ways:

- **Reduced risks.** APL enables faster and more structured engineering, with a selective compile and download feature that lowers risks when making changes to a running plant.
- **Fewer maintenance requirements.** APL is engineered, system-tested and documented by Siemens, eliminating the complexities of customized applications.
- **Simplified internal and external support.** APL leverages standard system documentation, flattening the learning curve for engineers overseeing multiple projects and increasing the efficiency of technical support for PCS 7.
- **Easier upgrades.** Standardization on APL mitigates the challenges and risks associated with future PCS 7 version upgrades. "Feature bits" built into APL blocks preserve all existing functionality when upgrading and eliminate the need for regression testing.

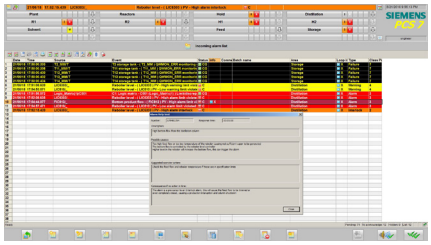
85% reduction in engineering efforts | Trident Automation

Trident Automation has experienced firsthand how the Advanced Process Library facilitates the process of upgrading a control system. “We’ve converted several sites from a non-Siemens DCS to PCS 7 with APL, and then later to a newer version of PCS 7, and the difference in ease of transition is significant,” says Jason Hurst, Principal and CEO of Trident Automation in Kimberly, WI. “In the past, custom code was commonplace for our customers, which became a problem when the next software version was released and testing needed to start all over again. This led to increased engineering efforts and often ran up project costs. But with APL in place, we no longer need to vet out every block and test its functionality. Elements like faceplates, help files, documentation and support are all included.”

Hurst estimates that engineering efforts are reduced by as much as 85% when performing an APL-to-APL upgrade. But the benefits extend even further: “Whenever custom code is rewritten, there is the chance for errors to be made in interpreting the code, and those errors could make it into production. APL greatly minimizes this risk.”



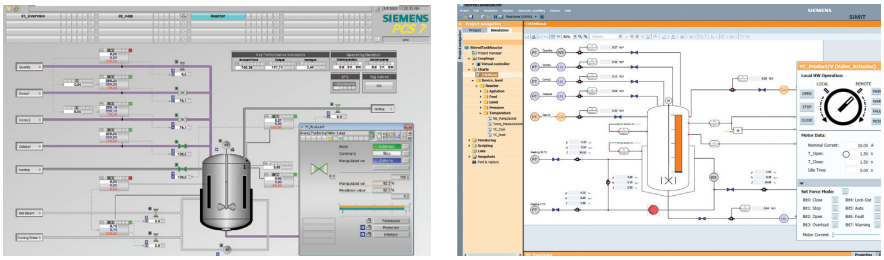
The APL features interlock functionality that helps to more quickly diagnose the root cause of an interlocked device.



Advanced Alarm Management.

APL enhances the operator experience as well, with advanced yet user-friendly interfaces that improve visibility into the status of every process and minimize troubleshooting time. When a fault occurs, APL navigates automatically from the affected block icon to the configured interlock faceplate or the PCS 7 Logic Matrix interlock management tool for an optimized overview of the interlock state. Operators can more quickly diagnose the root cause of an interlocked device and return the process to normal operation.

APL also features advanced alarm management options that make it easier to comply with ISA-18.2 and IEC 62682 standards. User configurable message classes support youin prioritizing alarms based on a variety of criteria, ensuring that each alarm’s relative importance is presented consistently throughout the OS. A response procedure known as Alarm Help provides operators with relevant guidance on each alarm, including likely causes, potential consequences of inaction, required next steps and allowable response times. The information for Alarm Help is captured in a master database during the alarm rationalization process and thirdparty tools can import the results directly into PCS 7 – thus automatically configuring Alarm Help for each rationalized alarm. This function reduces the amount of time necessary to correctly diagnose a problem and determine the appropriate corrective action, which is especially crucial for safety-critical and infrequently occurring alarms.
Using APL can also accelerate commissioning and Factory Acceptance Testing in addition to enriching the quality of operator education. That’s because APL ensures tight integration between PCS 7 and the SIMIT Simulation Platform, a Siemens software solution for virtual automation testing and training. APL templates utilized to automate a process have corresponding templates in SIMIT that accept the outputs from the control system and provide appropriate feedback – no manual adaptions necessary. APL makes it easier to create a true mirror image of your control system logic in SIMIT. Plus, any updates to APL are reflected in the SIMIT templates, so the two platforms always remain in sync. With the use of SIMIT templates and the SIMIT Solution Device Library each library component of the APL has an appropriate counterpart to cover the demands of an cutting edge test environment based on Control Module Types.



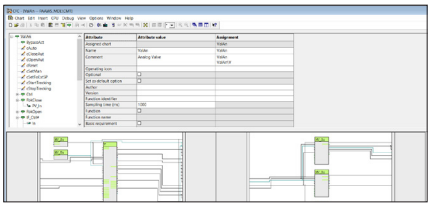
The APL makes it easier to create a true mirror image of control system logic in the SIMIT Simulation Platform (SIMATIC PCS 7 left; SIMIT right).

But APL's capabilities don't end there. Further unlock the potential of PCS 7 with built-in and add-on features such as Control Module Types, Advanced Process Graphics and the Industry Library.

Control Module Types – Supercharge your engineering

Take your engineering to an even higher level of efficiency with Control Module Types (CMTs), an innovative standardized module offered as part of the Advanced Process Library. With CMTs, it's no longer necessary to manually create a separate template for every variation of a function block. Instead, CMT technology allows you to develop one master template with an unlimited number of variants. For example, a single control valve CMT can capture the full spectrum of options for communication, limit switches and more. Changes made to the master template can be synchronized to every variant – resulting in easier adaptation to new or changing requirements.

CMTs lead to faster, less error-prone bulk engineering and streamlined long-term project management. Bulk engineering with CMTs can be managed via the SIMATIC PCS 7 Technological List Editor, a Microsoft Excel-based editor requiring no system-specific skills, or the PCS 7 Plant Automation Accelerator, a fully integrated and centralized software solution for the planning and documentation of plant projects.

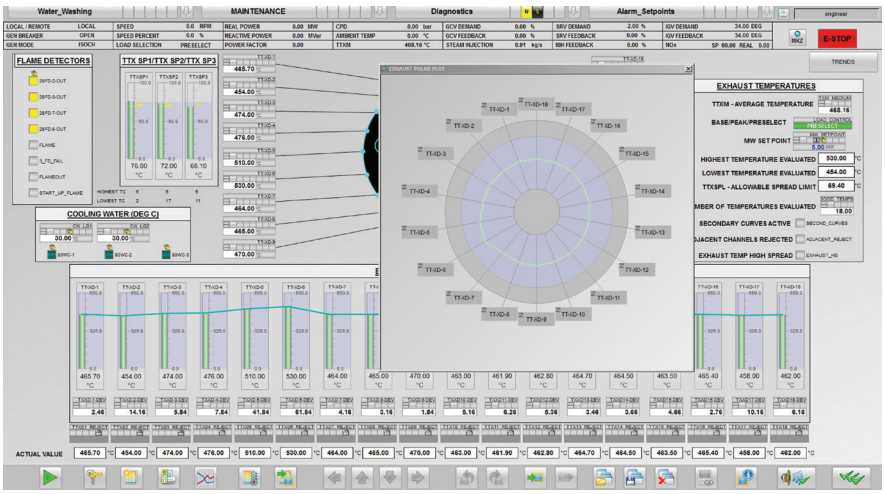


Advanced Process Graphics – Take the guesswork out of your HMI

Operator screens can be busy, displaying process data with no context as to whether the process is running within normal range. Advanced Process Graphics (APG) for SIMATIC PCS 7 presents the state of your plant – including all relevant operating parameters – in clear graphic form, making it easier to evaluate the status of each process and identify trends before alarms are triggered.

Available as an add-on enhancement for the Advanced Process Library, APG collects real-time data and converts it into hybrid bar graph/process tag displays, spider and trend charts, Kiviat diagrams, and KPI overviews to focus the operator's attention on the most important tasks. Graphic objects created in APG are tailored to the design and operating philosophy of APL for a harmonized user experience. What's more: APG now supports 4K Ultra HD monitors, so you can fit more information on a single screen at a very high resolution.

By reducing HMI complexity, APG's state-of-the-art process visualization empowers operators to make critical decisions swiftly, confidently and with fewer errors – leading to increased productivity and higher product quality.



Pigler Automation used Advanced Process Graphics to clearly visualize the health and status of a gas turbine control application.

APG provides more actionable process visualization | Pigler Automation

Pigler Automation in Longmont, CO, successfully used Advanced Process Graphics in a gas turbine control application. "APG allowed us to provide our customer with an HMI enabling operators to see the process status in a compact and highly sophisticated manner," says COO Harry Pigler. "Specifically, the spider graphic helped to visualize the temperature profile of the turbine's combustion chamber. The enhanced bar charts were also very much appreciated by the operators. They can quickly identify whether the system is in a good state or whether actions are needed, based solely on the shape of the APG icons. APG follows all the latest industry HMI guidelines, such as muted colors for values in the acceptable range. We highly recommend using APG for process overview screens and KPI displays."

Countless hours saved with APL templates | Trident Automation

"The Advanced Process Library provides a high level of consistency that makes it very appealing," says Nathan Nutter, Controls Engineer at Trident Automation in Kimberly, WI. "We can create our own templates and feel confident that when we update to a new version of APL, our templates will automatically receive all of the new and enhanced features that are continually being added by Siemens. We don't need to spend countless hours recreating these templates on every single version change. We also don't need to worry about any existing features requiring modification, because the structure of the existing features doesn't change."

SIMIT-APL integration reduces commissioning risks | RoviSys

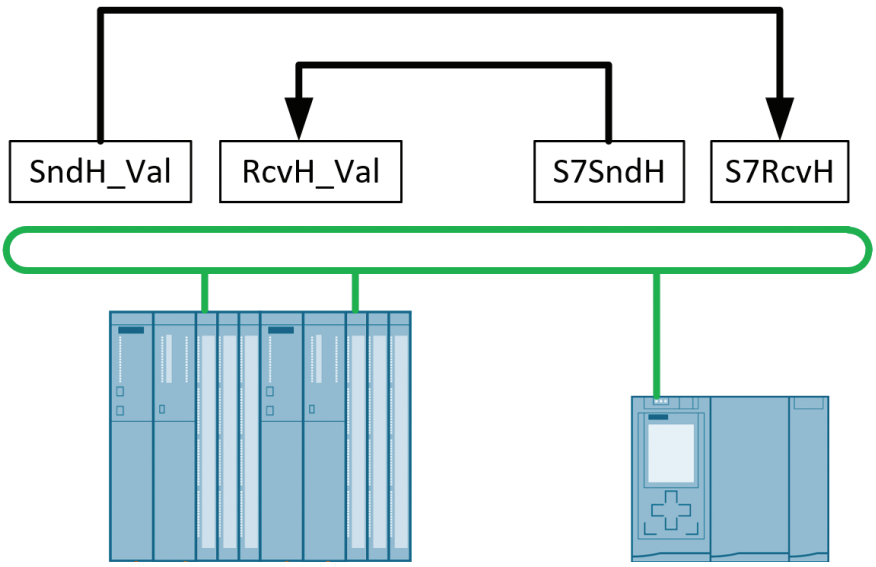
RoviSys in Aurora, OH, has leveraged the SIMIT Simulation Platform as a core component of virtual commissioning and the development of Operator Training Systems (OTS). According to Senior Engineer Josh Hilewick, "SIMIT has been especially helpful for Factory Acceptance Testing, management of change and operations training. By using the Advanced Process Library as the basis for our configuration, we have tight integration between PCS 7 and the SIMIT simulation model with little engineering overhead. Through the use of the SIMIT tools and various libraries, we can develop simulation modules for application testing or operator training needs. And with the help of the Component Type Editor, we can achieve even more advanced simulation modules without the need for additional process model simulation tools in some cases. Whether for a large greenfield project or a minor process change, we plan to continue leveraging SIMIT on each PCS 7 project because of its high value of return in confidence of the implemented PCS 7 system, earlier identification of potential design issues, and ability to reduce commissioning time. The SIMIT testing and simulation is then frequently turned into an OTS, which greatly speeds up control system acclimation and allows operators to be ready to work before the project is even commissioned."

Industry Library – Master industry-specific challenges

Every industry faces unique requirements and challenges when it comes to process control. The Industry Library for SIMATIC PCS 7 is an add-on product that extends the standard functionality of the Advanced Process Library with industry-specific, tried-and-tested function blocks and face-plates in the APL look and feel for a variety of sectors – including chemical, pharmaceutical, semiconductor, food and beverage, oil and gas, water and wastewater, and more.

Modules for HVAC technology are also available, making it possible to integrate building automation into the overall control system for improved operating efficiency, such as in pharmaceutical or semiconductor fabrication applications. And to better support the brewing industry, the Industry Library includes libraries specially developed for breweries from the Siemens BRAUMAT system for batch automation and route control.

Incorporate Siemens PLCs into your PCS 7 control system with specialized Industry Library blocks for standardized communication between SIMATIC S7-400 controllers and S7-1500 PLCs. Operators now have the option to run an entire plant from a single PCS 7 operator station – even if the facility contains S7-1500 package units. In addition, the Industry Library fully supports on-site operator control and monitoring via SIMATIC HMI Panels, which combine high-resolution process visualization with intuitive touch-panel interfaces. By increasing the level of integration in your control system, the Industry Library simplifies planning and oversight while reducing the risk of faults.



The Industry Library enables communication between SIMATIC S7-400 controllers and S7-1500 PLCs, giving operators the option to run an entire plant from a single SIMATIC PCS 7 operator station.

Siemens AG
Digital Industries
Process Automation
Oestliche Rheinbrueckenstrasse 50
76187 Karlsruhe, Germany

Subject to change without prior notice
Article No. DIPA-B10167-00-7600
Printed in Germany