Introduction

Migration strategy from SIMATIC S5 to SIMATIC PCS 7

SIMATIC S5 has been successfully used as a complete family of PLCs for an extremely wide range of control tasks in the process industry and for factory automation for more than two decades already. Numerous SIMATIC S5 control systems are still carrying out reliable service, but fast-paced technological changes and growing market requirements will place ever increasing demands on the automation systems of today and tomorrow. Considering this, migration of your S5 control system to SIMATIC S7 is always a wise decision.

However, if the higher functionality of a Process Control System is truly what you require, Siemens can provide you effective migration solutions through our "Totally Integrated Automation" (TIA) concept.

The phase-out of the S5 products will make the maintenance of these PLC systems more difficult and expensive, but migration to SIMATIC PCS 7 will allow you to use the latest process control functions to decisively increase the productivity of your plant. The migration carried out by Siemens also allows a combination of SIMATIC PCS 7 with the SIMATIC S5 programmable controller.

The mixed design of process control system and PLC is referred to as a hybrid application. Hybrid applications should ensure that a process control system (PCS) is used which combines the best properties of both systems on one platform and provides common communication. Siemens can look back on many years of experience in the manufacture and installation of PLCs and fully developed PCSs, and is your competent partner for the optimum transition of your SIMATIC S5 PLCs to the SIMATIC PCS 7 process control system.

With SIMATIC PCS 7 we make a decisive contribution to expanding your competitive edge – you can profit throughout the complete lifecycle of your industrial plants. If a company wishes to strengthen its position in the market, it is essential to react flexibly and rapidly to new market requirements, while keeping interruptions in current operation to a minimum. This is where the strengths of the SIMATIC PCS 7 process control system from Siemens are to be found. As a corner pillar of the "Totally Integrated Automation" concept, it constitutes a completely integrated system which surpasses the capabilities of previous systems and satisfies all the demands you place on the process control technology: one control system for all industries and applications.

New perspectives with the SIMATIC PCS 7 process control system as a result of increased:

- Integration
- Performance
- Scalability
- Modernization
- Safety
- Innovation
- Global Network of Experts

System Aspects

- **HMI/batch**
  - Replaces old HMI
  - Replaces batch system
- **Controller/network**
  - Replaces controller
  - Gateway to SIMATIC PCS 7
- **I/O field connection**
  - Further use of I/Os
  - Field connection elements for SIMATIC PCS 7

Plant Aspects

- **Innovation pressure**
  - Improved process control
  - IT integration
  - Advanced process control & asset management
- **Lifecycle phases**
  - Maintenance & modernization
  - Expansion & improvement
  - Renewal/replacement with state-of-the-art technology

Production Aspects

- **Strategy**
  - Plant/product future
  - Planned modernization (revamping)
- **Cost reduction**
  - Maintenance budget
  - Investment budget
- **Time-to-Market**
  - Production time
  - Available downtime

Innovative Technologies
Siemens will show you the advantages provided by modernization and optimization of your machines and production plants without excessively taxing your budget, with the largest possible continued application of system know-how, and if possible without interrupting ongoing production.

The success of migration is dependent on a technical solution optimally matched to customer requirements and the respective plant. Therefore Siemens offers you tailored solutions for your SIMATIC S5 system in order to decisively improve the system functionality, availability and efficiency of your plant. Always according to the maxim:

- **Stepwise**
  Allows gradual introduction of new technologies at various levels of the existing system in an optimum manner for the respective plant

- **Adaptable**
  A procedure for maximizing the return on assets (ROA) matched to the life cycle strategy of the plant (retention and modernization, expansion and improvement, or renewal and replacement)

- **Flexible**
  Considers the commercial aspects of production and plant management, i.e. required increases in capacity, expansion of product range, reduction in costs, or shortening of time-to-market

Our strategy thus allows you to set a schedule matched to your specific requirements – optimized according to factors such as capital expenditure, interruption of production, and personnel requirements.

We do not determine a specific strategy for you – we offer various options which you can implement step-by-step!
Migration Scenarios
System expansion with SIMATIC PCS 7

Based on our many years of experience in the migration of various programmable controllers and process control systems, we have developed the following options for the SIMATIC S5 PLCs with which you can meet your migration requirements:

- System expansion with SIMATIC PCS 7
- Migration of the SIMATIC S5 controllers with retention of the S5 input/output modules
- Complete replacement with retention of field cables

System expansion with SIMATIC PCS 7

The existing SIMATIC S5 system architecture is expanded by SIMATIC PCS 7. The S5 operator panel or SCADA system is retained, and is used parallel to the HMI of the connected SIMATIC PCS 7 architecture.

In this case the SIMATIC S5 PLCs are connected as slaves to the SIMATIC PCS 7 controllers and expand the previous programmable controller through alarm management, asset management or graphic visualization functions. The existing process interface equipment is retained in this case.

When an S5 PLC and a SIMATIC PCS 7 are used in parallel, the controllers communicate by means of a media converter which converts the SINEC H1 bus of the S5 PLC to Industrial Ethernet. Relevant data can then be exchanged with simultaneous use of the state-of-the-art applications offered by SIMATIC PCS 7.

Your benefits:

- Minimum costs
- Clear risk
- New application possibilities
- Access to the system from the IT world

Fig. 1 System expansion with SIMATIC PCS 7
Migration of the SIMATIC S5 controllers with retention of the S5 input/output modules

With this solution, the existing SIMATIC S5 CPUs are replaced by modern SIMATIC S7-400 CPUs. The ET 200U input/output modules of the SIMATIC S5 system can be connected directly to the new system over PROFIBUS DP. A connection between a modern S7-400 controller and other S5 input/output modules can be established via the IM 463-2 interface module.

To this end, the interface module is inserted into the SIMATIC S7 controller and connected to the interface module of the S5 expansion units. The input/output modules of the SIMATIC S5 controller present in the latter as well as the field cabling are retained.

The new S7-400 controller subsequently takes over communication with the new SIMATIC PCS 7 server. Configuration of the S5 modules is significantly reduced by using CFC driver blocks.

With an S7-400 controller, modern ET 200M modules can also be linked to the system structure. If necessary, obsolete and no longer reliable S5 input/output modules can be replaced at any time by input/output modules from the ET 200M range.

These migration possibilities allows you to reuse components worth retaining, with simultaneous application of the advantages provided by SIMATIC PCS 7.

Your benefits:

- Stepwise transition to SIMATIC PCS 7
- Hardware which already exists and is still suitable can be used further
- Cheaper than complete replacement

For further information on this solution, visit our homepage: www.siemens.com/IT4Industry

You can of course also reach us by e-mail. We will be pleased to answer your questions: softwarebausteine.solutions@siemens.com
Complete replacement with retention of field cables

Comprehensive modernization often becomes necessary because of bottlenecks in the provision of spare parts for the old system or the absence of support or important functional expansions, for example fieldbus technology or IT integration. In such cases it is worthwhile to completely replace the existing SIMATIC S5 PLC by the modern SIMATIC PCS 7 control system.

This modernization solution allows a step-by-step, tool-based system analysis with replacement of the SIMATIC S5 PLCs and input/output modules by modern ET 200M and SIMATIC S7-400 modules which communicate directly with the host SIMATIC PCS 7 server/client architecture.

However, the decision is often delayed because high costs are expected and because it is feared that long downtimes for machines and plant will result in economic disadvantages. This doesn’t have to be the case!

Our I/O adapter allows you to retain your existing fieldbus cabling.

The high requirements for new loop checks are then omitted, and signal tests can also be largely omitted since reconfiguration of the signals is carried out in the software by means of an assignment list. Furthermore, machine and plant downtimes are reduced to the smallest possible length. This procedure not only significantly saves time and costs, it also contributes to a significant minimization of errors.

As a result of the complete replacement, all possible functions of the state-of-the-art process automation system are made available. At the same time, all worries associated with a phased-out system are eliminated, e.g. double stocking of spare parts, increased qualification requirements of personnel, and larger maintenance requirements.

A shortest possible downtime is of prime importance, as is the extensive further use of the plant know-how stored in your previous system.

Your benefits:
- Functionality and performance appropriate to requirements through use of SIMATIC PCS 7
- Investment security resulting from the TIA concept (Totally Integrated Automation)
- Optimized implementation of migration with regard to performance and quality
- Maximum flexibility and lowest possible maintenance requirements

Fig. 3 Complete replacement with retention of field cables
Expert know-how for migration

There are many reasons in favor of Siemens as your automation partner with a future. Siemens and the network of Certified Solution Partners for Siemens products and solutions successfully implement the migration of SIMATIC S5 PLCs to SIMATIC PCS 7 by applying migration strategies which are flexibly matched to your technical requirements. As a result of our migration concepts, our many years of experience with migration, and our global support, Siemens can offer an unbeatable performance mix with maximum added value which could provide the desired productivity advantage over your competitors.

Trust in the globally leading SIMATIC technology in order to safeguard your investments in new automation technology for the future. And therefore profit from the performance features of the modern SIMATIC PCS 7 process control system and the synergy effects from Totally Integrated Automation.

References

Many migration projects have already been carried out successfully in many different industrial sectors.

Oiltanking Malta Ltd., Malta

To guarantee long-term availability for the plant with state-of-the-art technology and also to reduce servicing and operating costs further, the automation technology of the complete tank farm was migrated from the S5 PLCs and DOS-based visualization to the SIMATIC PCS 7 process control system.

Customer: Oiltanking Malta Ltd., Malta

- 4 tank fields
- Capacity 485 000 m³

Technology overview

- AS 400F with S7-417-4H CPU
- Ethernet, PROFIBUS DP and PROFIBUS PA, fail-safe
- SIMATIC ET 200M distributed I/O
- 2 500 I/Os

Project specifications

- Integral safety concept, fail-safe program in the CPU
- Plant conversion during ongoing production
- Maintenance work and program changes can be carried out via ISDN router
- Visualization of the complete plant
- Data archiving of all messages, operating hours and actual flows

Further references available on the Internet at www.siemens.com/simatic-pcs7/migration
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