ABB Contronic P process control system

Migration to SIMATIC PCS 7

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www.siemens.com/simatic-pcs7/migration
# Introduction

## The Siemens migration strategy

Globalization and permanently increasing competitive pressures are forcing companies to continuously increase productivity and to shorten time to market for new products. It is necessary to continuously optimize engineering and process functionalities while taking into account new industrial requirements and regulatory directives at the same time.

Many systems and plants have to be expanded or modernized in order to satisfy tomorrow’s market requirements. Since the installed base with regards to hardware, application software and know-how of the operating and maintenance personnel represents an enormous value, the safeguarding of investments for the plant owner is always of particular importance.

Experience has shown that the success of a migration action significantly depends on a technical solution optimally adapted to customer requirements and the respective plant. The main objective is to minimize the technical and financial risks and to safeguard investments which have already been made for as long as possible. The different life cycles of the system components must also be considered, which currently vary between 5 years for PC-based workstations, 15 years for controllers, and up to 25 years or even more for input/output (I/O) components and wiring.

Therefore Siemens mission is not just to replace an existing system but to elaborate an individual, future-oriented solution based on the state-of-the-art SIMATIC PCS 7 process control system in close coordination with the customer and his system integrators - always regarding the directives:

- **Stepwise**
  - Allows the gradual introduction of new technologies at the 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**
  - Takes into account the commercial aspects of production and plant management, i.e. required increase in capacity, expansion of product range, reduction in costs, or shortening of time-to-market

## System aspects

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<tr>
<th>HMI/batch</th>
<th>Replace old HMI</th>
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<td>Controller/network</td>
<td>Replace controller</td>
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<td>I/O field connection</td>
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## Plant aspects

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<td>Advanced process control &amp; asset management</td>
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<td>Life cycle phases</td>
<td>Maintenance &amp; modernization</td>
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<td>Renewal/replacement with state-of-the-art technology</td>
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## Production aspects

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<td>Time-to-Market</td>
<td>Production time</td>
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<td>Available downtime</td>
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## Innovative technologies

- **Step-by-step**
- **Adaptable**
- **Flexible**
**Expectations placed on an optimum migration solution**

Early on Siemens recognized the significance of migration for process automation, and has offered a wide range of innovative migration products and solutions for its globally proven systems for many years already. Right from the beginning, the maxim of Siemens’ migration strategy is to modernize the existing installed base in steps and without completely changing the system – if possible without a plant shutdown or with minimum production downtimes. Siemens therefore supports customers’ endeavors to achieve long-term safeguarding of investments together with maximization of their return on assets, even for old systems from other vendors.

Siemens has been consistently expanding its migration know-how for many years. The experience gained in numerous migration projects is incorporated into new products and technologies which are even more efficient.

**Comprehensive modernization**

Bottlenecks in the provision of spare parts, insufficient support, and the necessity for functional expansions (e.g. fieldbus technology or IT integration) can also force comprehensive modernization of the old system using the future-oriented SIMATIC PCS 7 process control system. Conversion is even possible during operation. The existing field wiring is retained, as well as the investment in field instrumentation and applications engineering.

**Your advantages/benefits**

- Increase in performance
- Introduction of new technologies (e.g. PROFIBUS fieldbus, HMI (Human Machine Interface))
- Opening of the system for the IT world
- Extended life cycle of the complete plant
- Reduction in the number of suppliers
- Elimination of bottlenecks
Migration of ABB Contronic P to SIMATIC PCS 7

Migration of ABB Contronic P

Convert old to new - that is migration

When we refer to Contronic P migration, we mean the modernization into a new, state-of-the-art platform which is not usually downward-compatible. The change can take place in one go (rip-and-replace, bulldozer) or in steps. Stepwise migration increases the usable life time of components and thus reduces the life cycle costs of the total plant.

Why migration?

The Contronic P system from Hartmann & Braun (now ABB) was officially discontinued in 1999. Already now, many components can only be replaced in that they are repaired. According to manufacturer information, availability of Contronic P spare parts will cease in 2009.

The consideration for using components from replaced systems as spare parts for plants which are still running is inappropriate: different firmware releases result in incompatibility. Furthermore, unused electronics ages and involves the risk of failure.

Other general reasons for a change in system include:

- Limitation of old system with regard to new requirements such as batch (S88), validation support (21 CFR Part 11, audit trail, etc.)
- Absence of integration facilities for optimizing business operations (collaborative manufacturing), e.g. integration in Manufacturing Execution Systems (MES), ERP coupling, etc.
- Reduction in burden on plant operators through alarm hiding (EMUA)
- Reduction in burden on maintenance personnel e.g. through modern asset management and remote maintenance with consideration of IT security directives
- Further optimization of operations through merging of control rooms

Fig. 1: Contronic P process and control stations
Siemens proven migration strategy for Contronic P

The vertical step concept has proven to be the best solution for cost-effective stepwise migration with Contronic P plants. Contrary to the horizontal step concept, where individual layers of the control system (OS, AS and I/O) are replaced in succession, measuring points are imported one at a time into SIMATIC PCS 7 in this case.

The great advantage: this procedure permits conversion during operation. A plant shut down is unnecessary.

Further advantages:

- The rate of conversion is freely-selectable. The plant owner as well as the supplier can carry out the required work in a relaxed manner, free from all deadline pressures. This reduces the risk of errors, and eliminates the economical consequences of the almost unavoidable shifting of deadlines.
- A fallback strategy in the event of malfunctions caused by the change in system is unnecessary. This again reduces the costs.
- It may be possible to omit tests and trial runs.

Practice has shown: such a procedure can certainly require several years. It is then possible to align the required investments better to the long-term financial planning.

Plant operators have been very enthusiastic because they have sufficient time to become acquainted with the new user interface: initially there are only a few measuring points to be operated in the new system. Confidence grows every day, and also the number of measuring points in line with increasing capabilities.

Modernization and transfer of application

Siemens has developed powerful tools in a wide range of projects which help to:

- Transfer the application from Contronic P to SIMATIC PCS 7
- Convert optimized parameters to SIMATIC PCS 7 with largely the same effect
- Indicate multiple applications and interconnections of I/O signals for safe conversion of the field wiring (also during operation)

Conversion of the application is not carried out block-by-block (1:1), but according to functions: e.g. a valve or motor control is implemented by a corresponding typical in SIMATIC PCS 7.

The advantage: the SIMATIC PCS 7 application can be read, and is therefore also easy to modify. This would not necessarily be the case with a block-granular conversion: in this case, each block of the old system would be replaced by the interconnection of new blocks with the same effect. Because of the unavoidable increase in the number of blocks, the new function chart could rapidly become unclear.

Fig. 2: Transfer of application
Conversion of I/O signals

Different concepts are used here depending on the wiring method or standard, available space in the cabinet room, and required plant availability:

1. **Conversion directly in the Contronic P cabinet**
   The interior of the existing Contronic P cabinet is removed. The front connectors on the I/O modules are plugged onto adapter terminals (Fig. 4). Preassembled cables lead to SIMATIC ET 200M modules.
   **Advantages:**
   - Short conversion duration and low test requirements
   - Existing cabinets can be used further
   - No additional space required for new system cabinets
   **Requirement:** plant shut down

![Fig. 3: Cabinet panel following conversion of I/O signals](image1)

![Fig. 4: Pre-configured cable connection between Contronic P and SIMATIC PCS 7/ET 200M](image2)

2. **Conversion on subdistributor**
   The signals (measured value and interlocking) associated with a measuring point are rewired at the same time. Tool-based data analysis lists the associated signals and recognizes multiple applications which must remain temporarily in the old system (temporary double wiring).
   **Advantage:** conversion possible during operation (Fig. 5).
   **Requirement:** additional space must be available for new SIMATIC PCS 7 components.

![Fig. 5: Conversion during operation](image3)
Trust through experience

Conversion is carried out by experienced specialists. Siemens concentrates the know-how for Contronic P modernization in Migration Support Centers (MSC). These centers handle projects on their own, but also together with a local system integrator selected by you.

Highlights of the migration solution from Siemens

The software-based migration of Contronic P to SIMATIC PCS 7 is carried out in clear, individually tested steps and features the following highlights:

• Importing of the Contronic P application into a database using the detailed online documentation and cross-reference lists of Contronic P
• Optional adaptation of the database using hardware planning tools (importing of the properties of measuring points such as signal routing, safety positions, etc.)
• Comprehensive typicals library corresponding to the technological blocks of Contronic P, based on the standard blocks of SIMATIC PCS 7
• Conversion of the proven application software through exchanging of typicals
• Adaptation of parameters for the same controller dynamics
• List of remaining work still to be carried out for 100% migration
• Planning and implementation of conversion (optional), for migration during operation

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

References for Contronic P migrations as well as for other systems are available at:

www.siemens.com/simatic-pcs7/migration
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