Features and Benefits

■ **Scalable System Architecture:** The system architecture can range from a single station to complex client/server architecture.

■ **Intuitive Engineering Environment:** Graphical user interfaces, object-related context menus, navigator and many help functions enable intuitive user guidance. Concurrent engineering is supported.

■ **Graphical Function Design:** Engineering versus programming. Provides graphical design of the entire control loop - from field devices to process logic. This enables easier engineering and maintenance.

■ **Reusable Solutions facilitate continuous improvement:** Facilitates the incorporation of "best practice" standards. The common framework allows logically defined solutions to be quickly reproduced and adapted to meet specific needs with minimum engineering and re-validation.

■ **Consistent forward documentation:** Due to a consistent forward documentation with modification and version management, the documentation is always up-to-date.

■ **Operator Graphics:** Operator graphics can easily be customized through the use of predefined elements and symbols.

Providing a single, accurate source of system information helps ensure data consistency and improves engineering performance throughout the lifetime of the automation system.

Industrial**IT** System 800xA's engineering environment for AC 870P/Melody based systems simplifies configuration, documentation, commissioning and maintenance. The AC 870P engineering tool composer supports a consistent information flow from design, through installation and commissioning, to operation and maintenance. It lays the foundation for continuous improvements in lifecycle and operation dimensions of information flow, resulting in engineering for maximum performance and real increases in overall productivity.

In general, AC 870P Engineering provides:

■ An extendable client/server architecture that supports multiple users operating in a network environment.

■ An integrated database management that ensures that the plant data and its concurrent documentation are always consistent and up-to-date.

■ Information that can be imported and exported using many popular or customized formats. By integrating third party applications, their relevant documents can be called up directly from the engineering workplace.

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ABB

Introduction

AC 870P Engineering, as described within this Overview Document, provides unprecedented information control from a single Engineering Workplace. The workplace supports the complete automation project including planning and data acquisition, configuration management, commissioning, and operation. Having an integrated environment for the full lifecycle of engineering leads to minimized system implementation costs and allows knowledgeable resources to focus their attention on value-added engineering instead of configuration.

Scalable System Architecture

The AC 870P engineering system architecture can range from a single station to complex client/server architecture with planning and diagnostic centers. Individual adaptation to the control system size is possible. One AC 870P engineering server can be used for several plants or separated parts of plant.

The engineering server communicates with its clients via the Engineering Network. In the design phase, the AC 870P Engineering System can operate without connection to the control system. Commissioning and maintenance require an Ethernet connection to the Onet (Operation bus).

Authorization Management

With authorization management, the system administrator can assign access rights of individual sections to individual users. This is accomplished by assigning individuals to one or more specific user groups for administration, editing, measuring, setting parameters, simulation, releasing, loading, maintenance and viewing only. For example through AC 870P authorization management, one user may have edit rights but cannot place anything in operation, while another user may set parameters and simulate but cannot make changes to function diagrams.

Intuitive Engineering Environment

Concurrent Engineering

The AC 870P engineering system supports concurrent engineering of the process control system. From the definition of process points and loops, function design, and system and cabinet layout, to service and diagnostics and library processing, all functions are available concurrently. This results in effective system configuration, documentation, commissioning, and maintenance.

System applications can be accessed by multiple users simultaneously. At any time, all data and documents are available to each user by means of the database management features. The same applications used during design are used during commissioning.

**Documentation and Information Management**

Documentation and Information Management simplifies designed data views including integrated third-party documents. For easy handling, AC 870P engineering applications are arranged in several views. These views are based on the standardized control system structure according to ISO/IEC 1346-1 and support the organization, navigation and location of control system data and documents.

Intuitive Navigation

Graphical user interfaces, object-related context menus, navigator and many help functions enable intuitive user guidance.

Process Loops, Process Points

Process control functions are usually accessed via the plant's process loops. With the AC 870P engineering system, process loops can be specified with one or several process points and attributes, such as long text, short text, measuring ranges and dimensions.
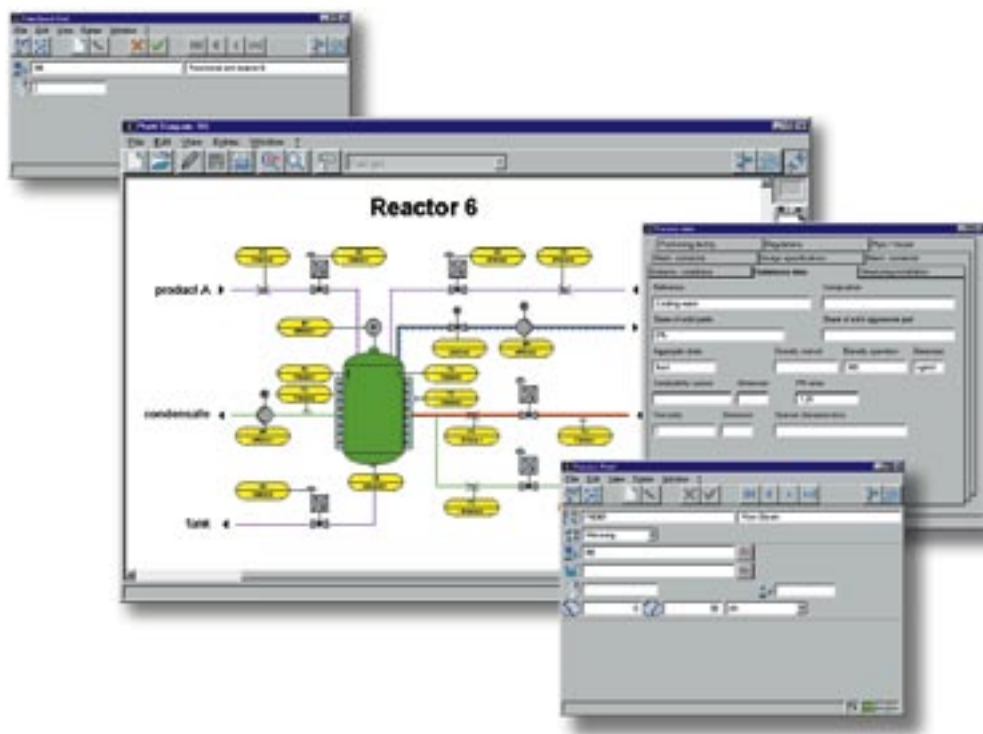
**Figure 1.** Function Unit, Plant Diagram, Process Point Definition and Process Data

AC 870P Engineering supports different coding systems, such as ISO 3511-1 or KKS (coding system for power plants) standards. Process data sheets are available for the detailed description of the process points.

Function units and plant areas are useful for a hierarchical function and plant structure. The generation of large data sets is typically made via the data import application. The processing of all loop-related data and the generation of process point and actuator lists is possible by means of the engineering tool.

Process and control correlations between the individual loops can be displayed in control engineering P&I diagrams, overview and area function diagrams.

Graphical Function Design

Function diagrams present the process loop's control strategy via individual function blocks. This graphical design contains modules for operating, processing or I/O and includes, if required, field devices. Function diagrams can span multiple tags on multiple pages. Signal connections, message specifications, archiving, alarms and comments are automatically cross-referenced throughout.
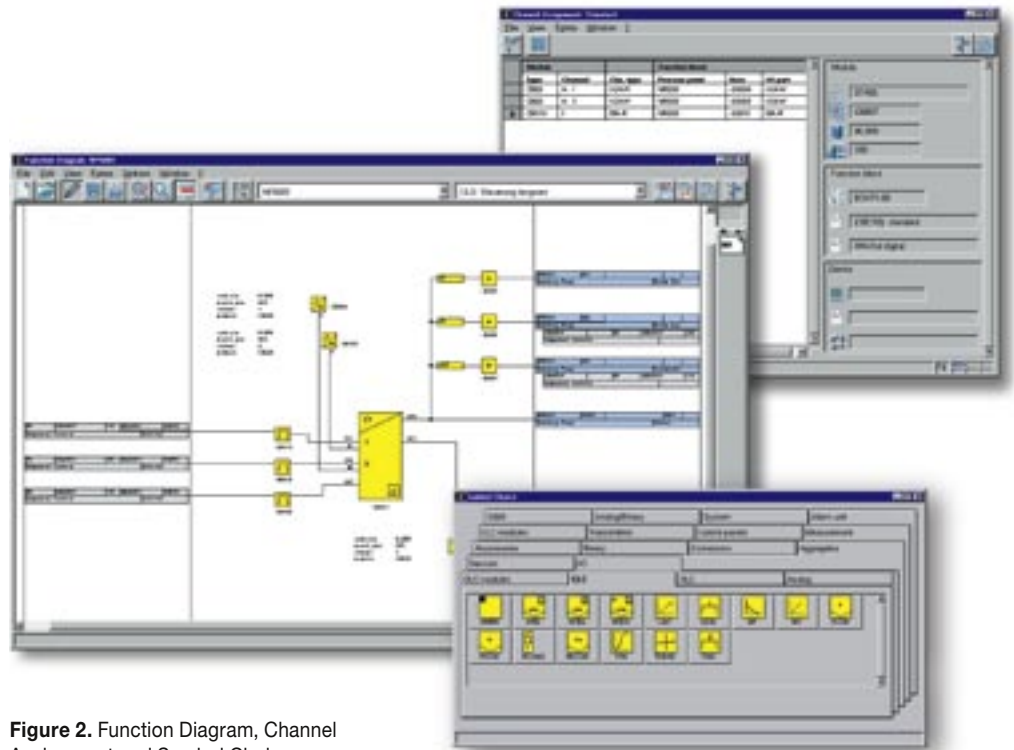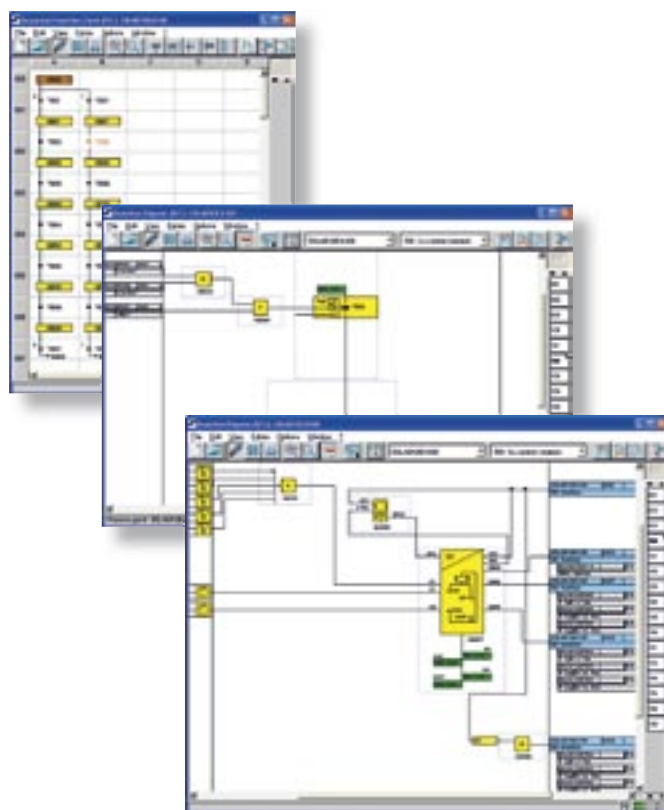

Figure 2. Function Diagram, Channel Assignment and Symbol Choice

Open libraries, which can be supplemented by the user, allow for quick processing and implementation of individual requirements. Function diagram symbols include function blocks and predesigned function diagrams and serve as templates for easy implementation of control strategies.

Several function diagrams can be processed simultaneously. Automatic plausibility checks, filtering, sorting and data coupling facilitate the engineering process.

Structuring and processing of sequence controls is generated via the integrated Sequential Function Chart Editor (SFC). The respective individual function diagrams with transitions and actions are automatically generated.

Representation for planners   Representation for operators

Figure 3. Data transfer from engineering to operation

Complete representation of the loop is the function documentation's key benefit. A direct loop-oriented loading of all function blocks is generated from the function diagram. Here, all respective components of the 800xA System, from I/O to operator stations, are provided with the data required for the commissioning and operation of individual loops.

This procedure results in consistent and complete forward documentation.

For efficient project engineering, further help functions are provided to the user at the compilation and editing stages. For example, not only is it possible to copy individual function diagrams, but complete data hierarchies such as function units and plant areas can also be duplicated.

Field Planning

800xA for AC 870P based systems communicate via a flexible and reliable bus system. The control system structure, station component assignment, and the network structure, are all designed using the AC 870P engineering tool. With direct access to specific module parameters, the engineering tool quickly adapts the components to the intended application. In addition, the data is used to define channel layout and task assignments. Extensive libraries with integrated plausibility checks assure trouble-free and smooth operation.
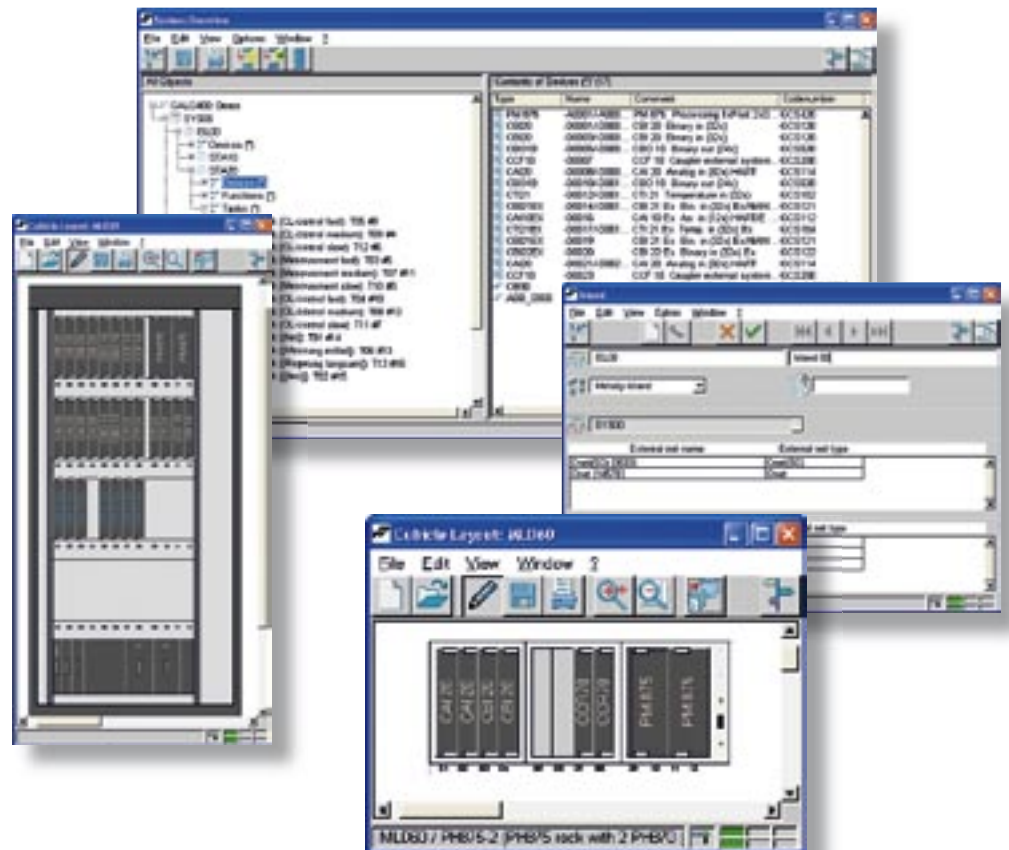
Figure 4. Cabinet Layout, System Overview, Island and Station Definition

Using the cabinet layout diagram editor, cabinet slots are assigned to the specific modules. Previously defined module redundancies are automatically taken into account. However, they can also be defined within the cabinet layout diagram editor.

Field Planning

The AC 870P engineering environment allows for data exchange with third party field-planning systems, such as Prodok or Iska. Through integration of data from these systems, AC 870P engineering automatically updates process point definitions, device, and channel layout data without the need for data re-entry.

Fieldbus Planning

800xA for AC 870P based systems fully integrate field devices through PROFIBUS technology. The AC 870P engineering's Field Device Tool (FDT) supports configuration, commissioning, and maintenance of PROFIBUS devices via Device Type Manager (DTM) technology. For field devices that have conventional device description files (GSD), a BasicPROFIBUS DTM is available; allowing standardized offline configuration. HART devices, through a BasicHART DTM option can be integrated, configured and parametrized via standard HART protocol without the need of additional tools. The individual device DTMs can be accessed from the tool's multiple data views, for example, the Functional Diagram, System Overview, and Location, etc.
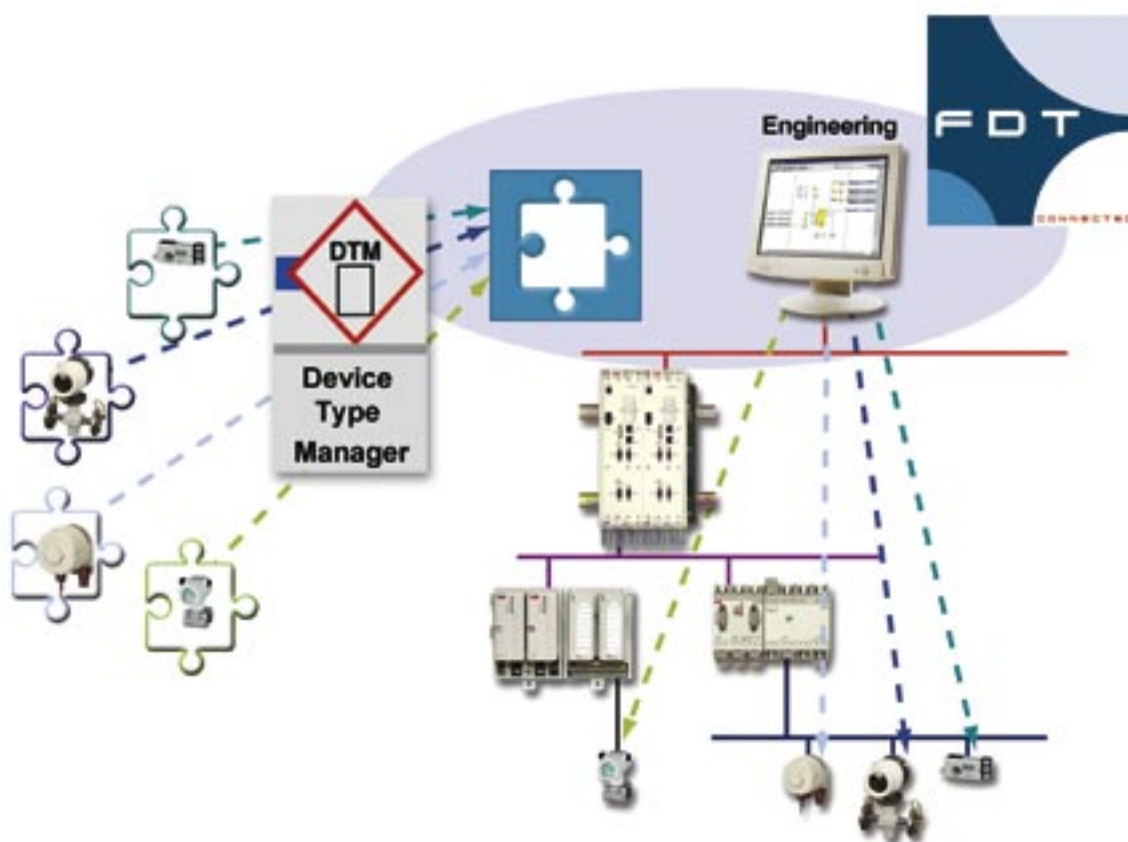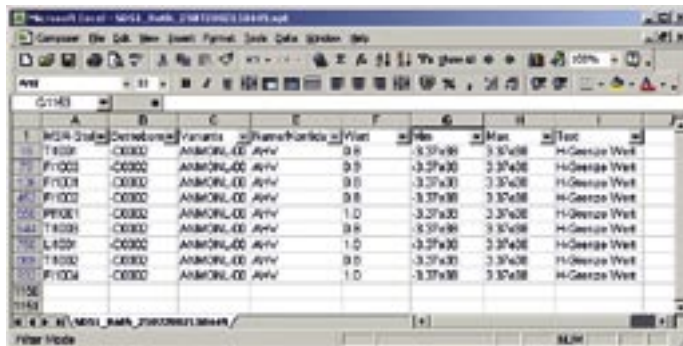
Figure 5. Efficient Fieldbus Planning with FDT/DTM

Optionally, the PROFIBUS master configuration is integrated in the AC 870P engineering environment. It includes net calculation and loading of process items by using the device-specific channel configuration generated by the DTM.

Reusable Solutions

Bulk Data Handling

The ability to efficiently manage large amounts of data is a crucial part of any automation system. 800xA for AC 870P based systems meet this requirement through tight integration of its engineering environment with Microsoft Excel®. By using a series of add-ins, the bulk data management features couple the productivity benefits of Microsoft Excel with AC 870P engineering.

Figure 6. Effective Bulk Data Handling

Libraries

The engineering libraries form the basis for all AC 870P applications. All components, devices, P&I diagrams symbols, operation and control processing function blocks, I/O configuration, coding or dimensions are included in these libraries. In addition, AC 870P engineering includes the necessary plausibility checks to ensure correct use of library elements.

AC 870P system libraries can be supplemented and modified to meet project specific needs. The macro editor, symbol editor, and assignment editor features are used to define and/or extend the library's standard function blocks.
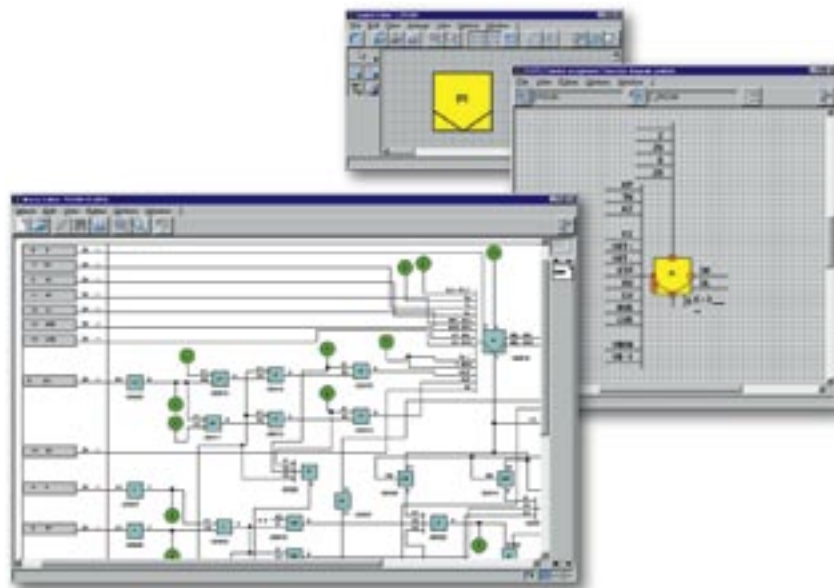

Figure 7. Macro Editor, Symbol and Symbol Assignment Editor

Service and Diagnostics

During operation, integration, and commissioning phases of the process control system life-cycle, it is important that the engineering system possess problem and error analysis features. With AC 870P engineering, the same applications that are used during the planning and design phase are also used during the commissioning phase. Component states, such as "initialized", "loaded", etc., are displayed directly on the engineering diagrams.
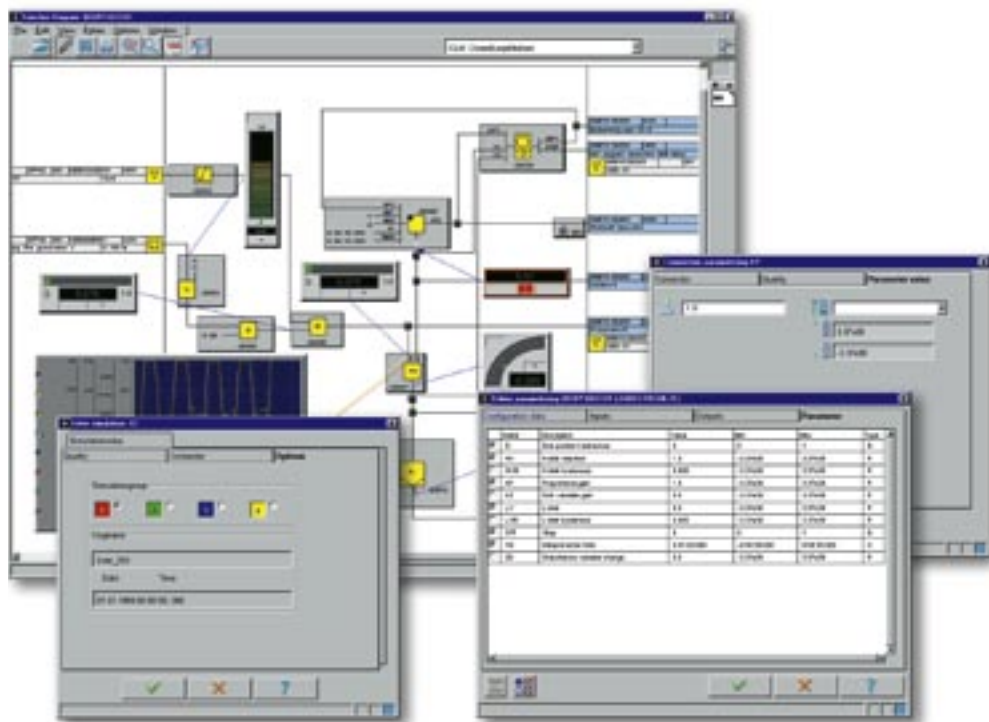
Figure 8. Parametrizing, Forcing and Displaying Live Values

In addition to displaying measured values, parameter definition and signal forcing can also be effected directly from the function diagram. Parameter settings are stored in the database.

Documentation and Information Management

Due to consistent forward documentation with modification and version management, documentation is always up-to-date. Documentation and information management facilitate access of and navigation to plant documentation. Technical product documentation is also accessible online.

If CAD systems are used, they can be accessed directly from the AC 870P engineering environment. Integration of document viewers is also supported. Third-party documentation is managed by the engineering system's object navigation and can easily be accessed via a single mouse click.

AC 870P Engineering combines documents in user-defined hierarchically organized folders. Reports can be issued directly from all applications within the AC 870P engineering system. User-defined report types are made available through Microsoft Excel®. Automatically transferring data with AC 870P engineering, Microsoft Excel formats and issues reports.

In views such as P&I diagrams, location structure, or functional structure, all information is displayed in hierarchical order. Data couplings enable easy access to processing applications. For further data selections in these views, all open applications are automatically linked to these data couplings.

In addition to information lines and smart help, the system documentation can be called up at any time.
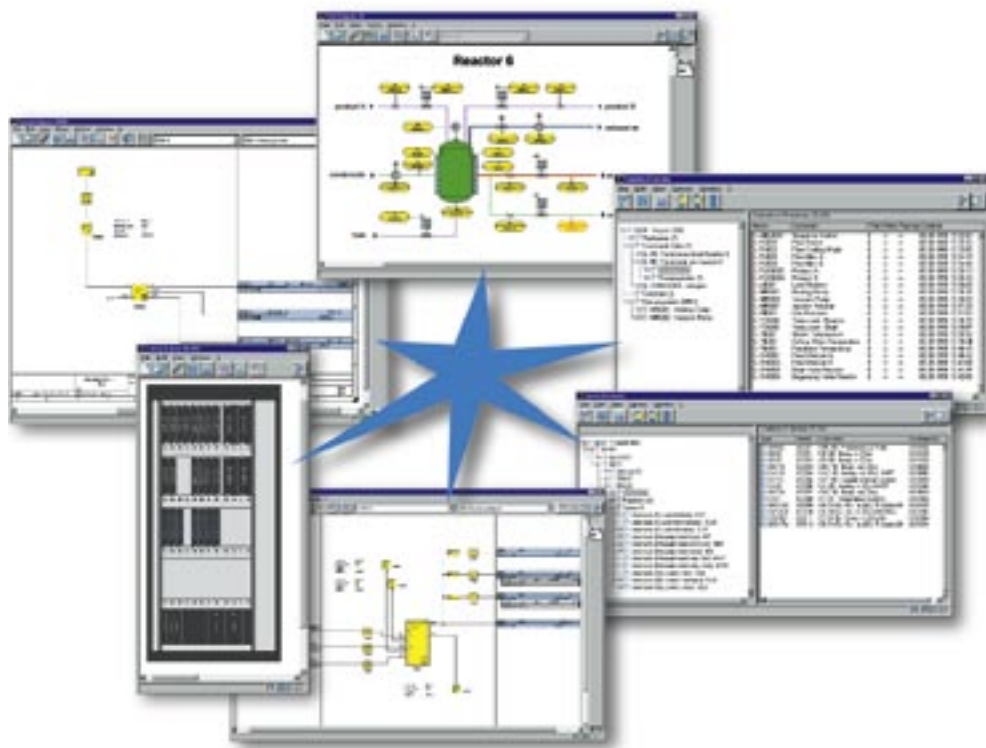
Figure 9. Object Search and Rapid Access

Audit Trail

Effective change management enables business to meet evolving business needs. Within the automation system, changes to system configurations must be carefully controlled to ensure all modifications are traceable. AC 870P engineering provides complete audit trail support for those industries that require regulatory compliance. AC 870P's audit trail functionality tracks and archives system changes, such as all on-line actions, field device actions, entering, changing, or deleting simulations, loading function diagrams, initialization, and replace of central units, etc.

Process Visualization

Graphic Displays

800xA Process Portal's graphical interface is based on ActiveX® technology, enabling the system to provide real-time dynamic status indications and hyperlinks within process graphics. The base system includes a comprehensive library of over 3800 ActiveX elements that can be used to create custom graphics. All graphics may contain photos, bitmaps, or graphics from third-party systems that support ActiveX technology.

For more information on the runtime graphics environment see the 800xA Operations Overview.
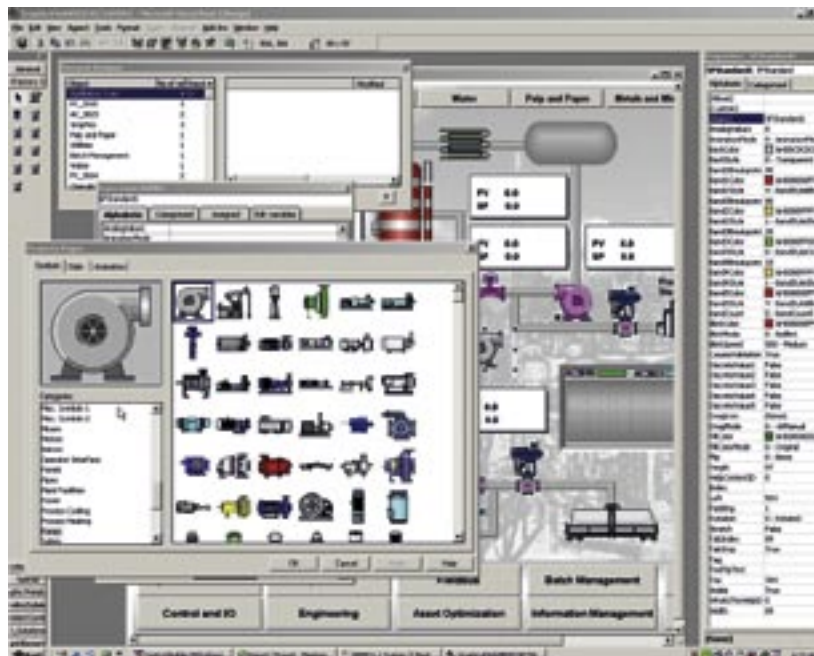
Figure 10. Create Graphic Displays for 800xA Process Portal

Faceplates

Faceplates in 800xA Process Portal have a standardized look and feel with three pre-configured views. This standardized faceplate concept minimizes configuration time. The minimal view displays critical information and is designed to occupy as little space as possible. The normal view and extended view provide additional information and access to tuning and extended alarm and diagnostic information.

Using System 800xA's document management capabilities, dynamic documents can be created by inserting an object reference. When the document is accessed, the object references can be automatically updated with live process values.

Navigation

Composer Navigation is a part of the AC 870P/Melody Engineering System which allows navigating from 800xA Operations to specified Composer function diagrams, cubicle layouts or system control structure.
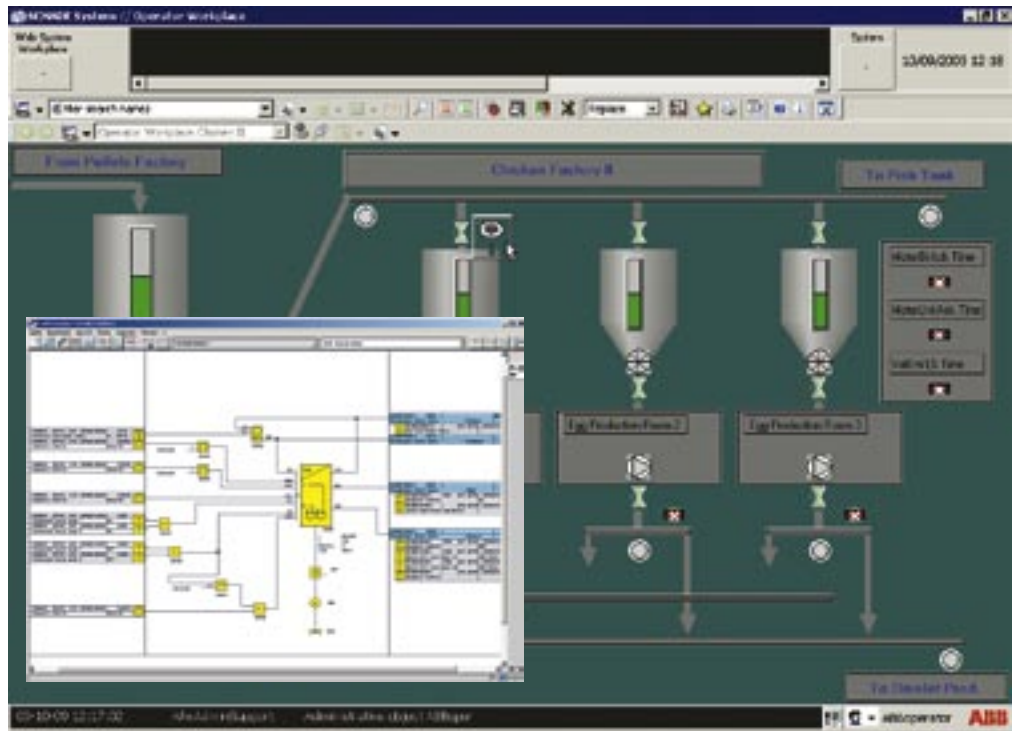

Figure 11. AC 870P Engineering as integrated part of 800xA Operations.

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