

## Features and Benefits

- **Integrated Engineering Environment**  
Supports the engineering of the entire extended automation system - from field device to plant management applications - throughout their entire life cycle.
- **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 of IEC 61131-3 applications.
- **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. When modifications are made to existing standards, instances are automatically updated.
- **Operator Graphics**  
Interactive operator graphics can easily be customized through the use of predefined elements and symbols.
- **Change Management**  
System configuration changes can be recorded and tracked to help meet regulatory requirements.
- **Integrated Documentation and Diagnostics**  
Documentation and diagnostic features of all integrated components and devices are easily accessible.



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 Engineering provides real-time information integration for better and faster access. Working within a common engineering environment, 800xA Engineering 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, 800xA Engineering provides:

- A fully integrated engineering environment for development and reuse of system standards, such as incorporating control logic, operator displays, and field device integration, asset monitoring, maintenance support, documentation.
- A single source of truth for all data within the system.
- A comprehensive set of libraries to streamline the engineering workflow.

## Introduction

800xA 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.

## Integrated Engineering Environment

Through the use of patented Industrial IT Aspect Object technology, the 800xA system provides tight integration of plant devices and applications. System 800xA's platform provides a common portal to all system information required to install, operate, and maintain the system. This portal handles all information, traditionally contained in disparate applications, into a single, intuitive user interface, while promoting the reuse of best practices.

800xA Engineering, coupled with this tightly integrated environment, is designed to facilitate one-time data entry for all areas within the automation system, from field devices to asset optimization, while ensuring built-in data consistency. Providing a single source of accurate and real-time plant information results in maximum engineering performance, quality, and reliability.

This integrated environment results in fewer startup delays, reduced maintenance costs, and more effective engineering practices.

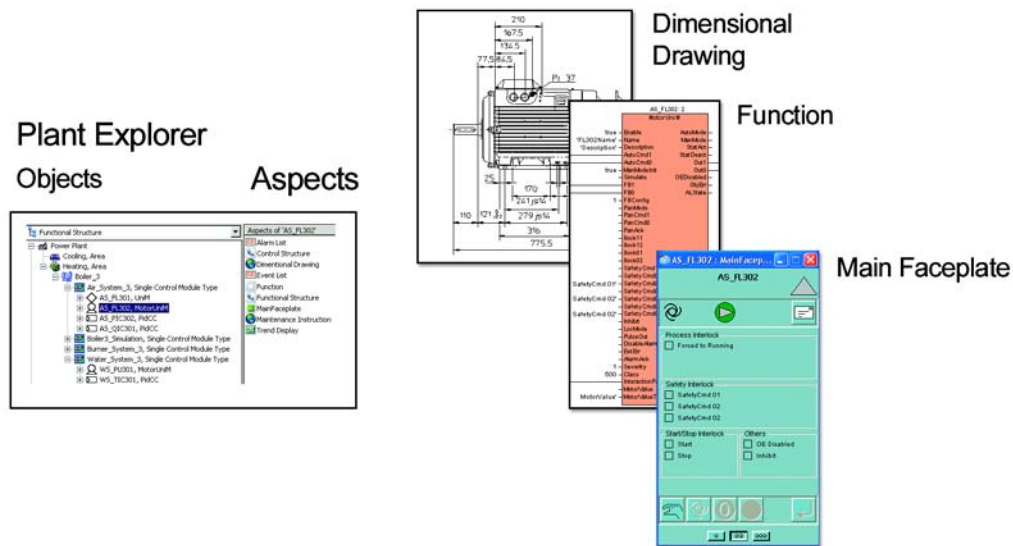


Figure 1. Typical Plant Explorer View with Objects, Aspects and a few Examples of Views

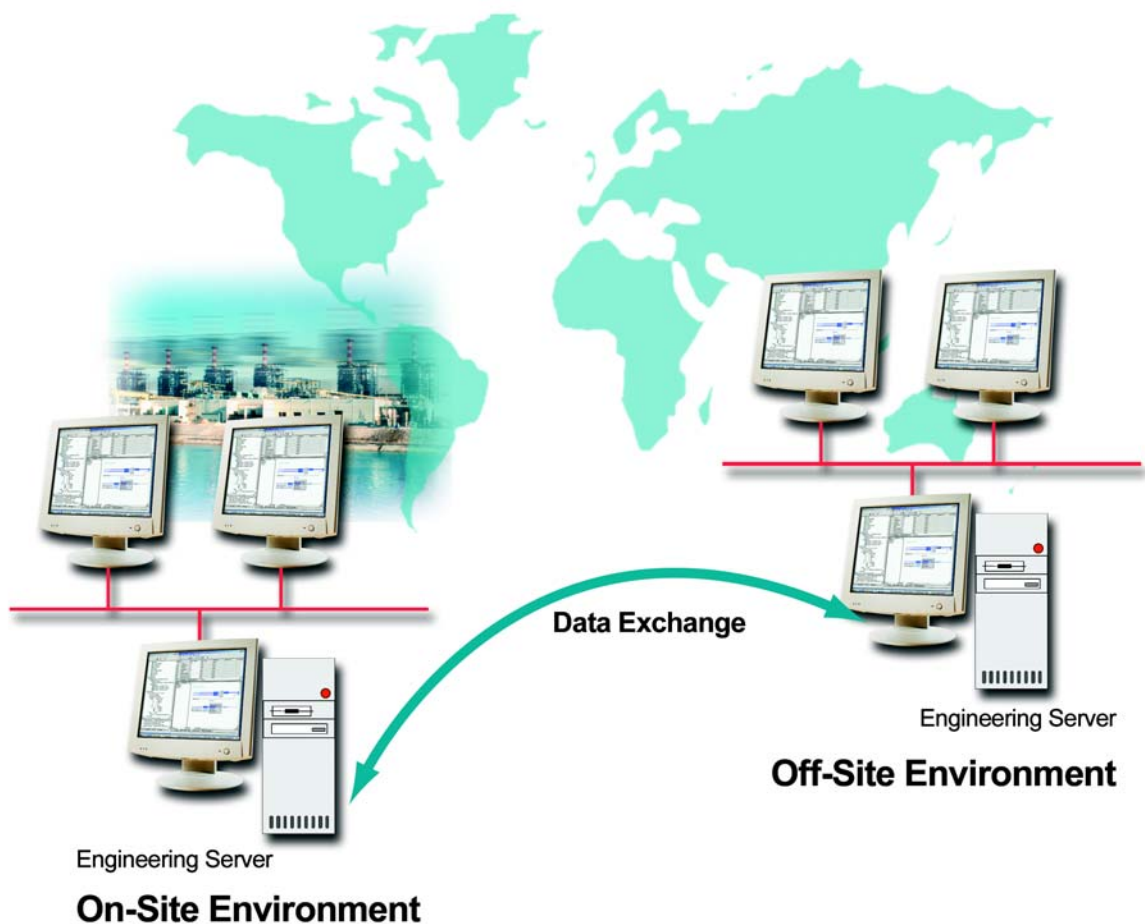
## Distributed Engineering

System 800xA provides a flexible, distributed engineering environment through the use of application servers. These servers manage project data and make it accessible to on-site connected users or isolated off-site engineering environments.

In a multi-user on-site environment, a variety of engineering tasks may be performed on a target system simultaneously. The results are applied to the target system automatically via the application servers.

In an off-site environment, engineering tasks may be performed in an isolated manner from other users and the on-line system. When the off-site tasks are completed, the user modifications can be applied to the on-line system through the application server's import/export features.

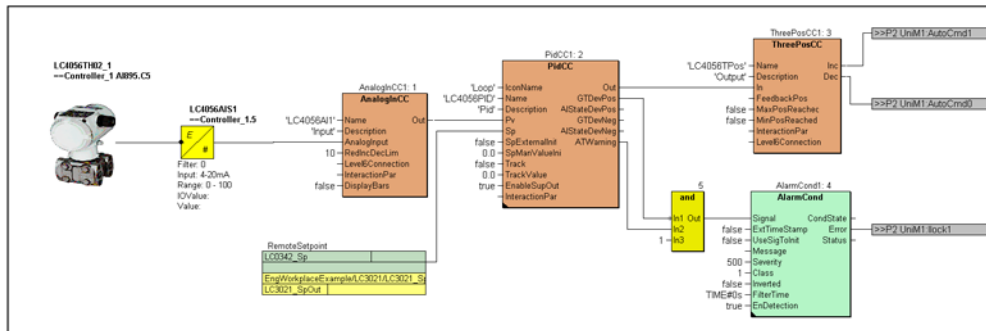
The import/export feature allows for selective transfer of configuration data between systems. In addition, it is possible to compare configuration data between the different systems and create reports on the differences.



**Figure 2.** Data Exchange Between Off-site and On-site Engineering Environment

## Graphical Function Design

800xA Engineering provides a unique graphical function design capacity that is used to design and modify the process functions that make up the control strategy. Users can create a single process function or build an entire control loop, by dragging items from a browser to the functional diagram. Each diagram can contain control entities from different functional areas of the plant such as controllers, I/O, field devices, and drives. The connections between these control entities present the relationships between the different areas, and direct navigation to detailed area. A typical Example is shown in [Figure 3](#).



**Figure 3.** Function Design Diagram of Process Objects

Typically, when designing control strategies it is necessary to define the initial control system architecture. System 800xA's function design eliminates this restriction by allowing users to design process functions and control loops without knowing these details. Once the architecture design becomes available, the control configuration can be allocated to the individual controllers and their respective I/O devices.

### Enhanced IEC 61131-3

The 800xA system supports a wide range of industry concepts including all five IEC 61131-3 standard languages. Since all languages can be simultaneously used in the same controller, users can select the language that best fits each area of their control application.

In addition, System 800xA further extends engineering flexibility through the use of Control Modules. This allows users to mix all elements of IEC 61131-3 into pre-defined algorithms, which hide the control logic details. By storing the Control Modules within a system library, these proven solutions can be continuously reused throughout the entire automation system or multiple automation systems, reducing engineering time and improving quality.

### System Wide Navigation

800xA Engineering provides the ability to graphically represent all functional areas of a plant within a single diagram. Representations can extend across multiple diagrams or sheets through the use of page and cross-reference links. These links allow users to seamlessly navigate through the entire system. See [Figure 4](#).

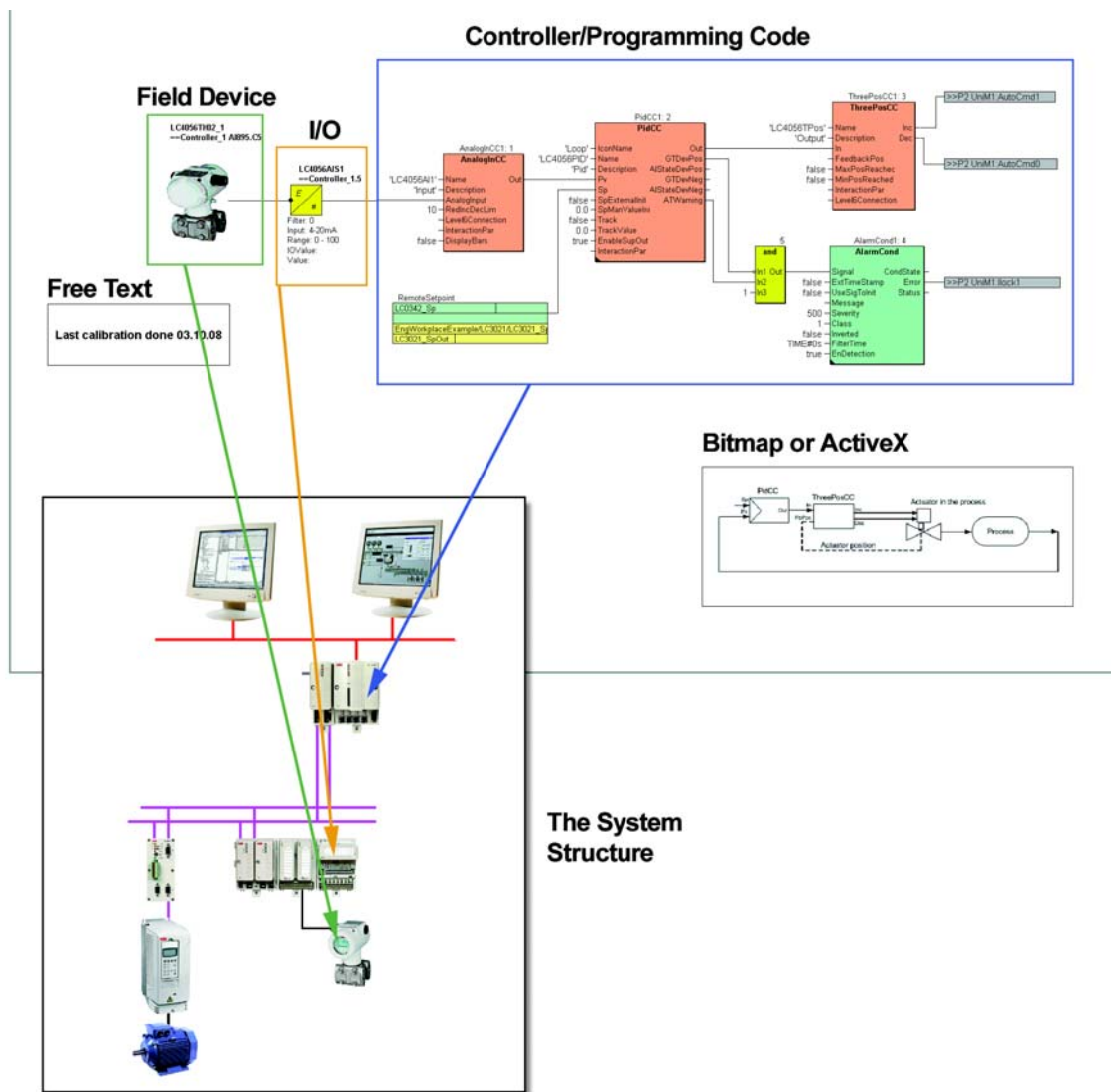


Figure 4. Easy Access to Devices from Functional Planning

## Monitoring and Tuning

800xA Engineering supports all phases of the plant lifecycle. From within a function diagram, users can diagnose and maintain the system by dynamically monitoring all signal connections' values and status. These values are displayed on the same diagrams used to configure the control strategy.

Within the function diagram, the user can access additional aspects of a control entity via context menus, providing instant access to faceplates, trends, repair instruction, field device information, or any other associated property. Figure 5 shows an example.

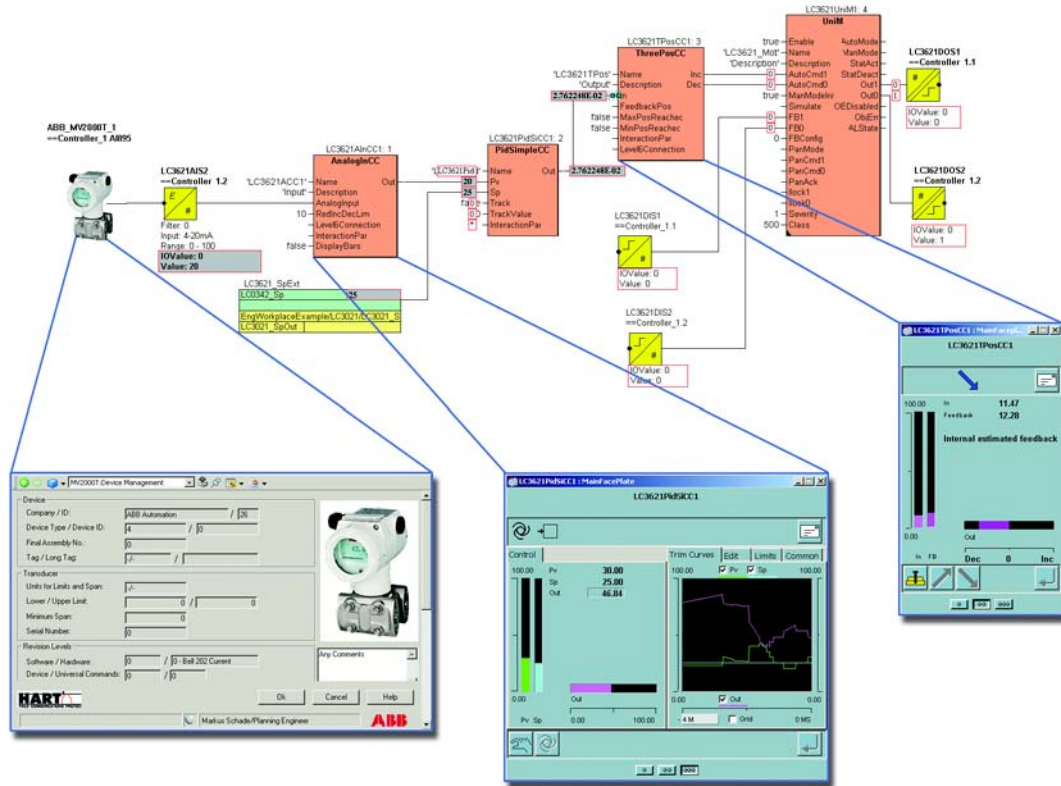


Figure 5. Online Values, Trends and Faceplates

In addition, process values may be tuned from within the functional diagram. Tunable values include setpoints, PID gain values, and alarm limits.

All aspects of an extended automation application may be combined, including control entities, I/O modules, field devices, and visualization. In traditional systems, these components must be managed with different tools. 800xA Engineering provides a single, unified environment, allowing process engineers view the outline of their automation solution, while having easy access to detailed information like function blocks or documentation.

The 800xA graphical function design feature provides a single user interface for configuring and representing control logic and devices. This simplifies documentation, reduces commissioning and maintenance time, and results in increased efficiency and quality.

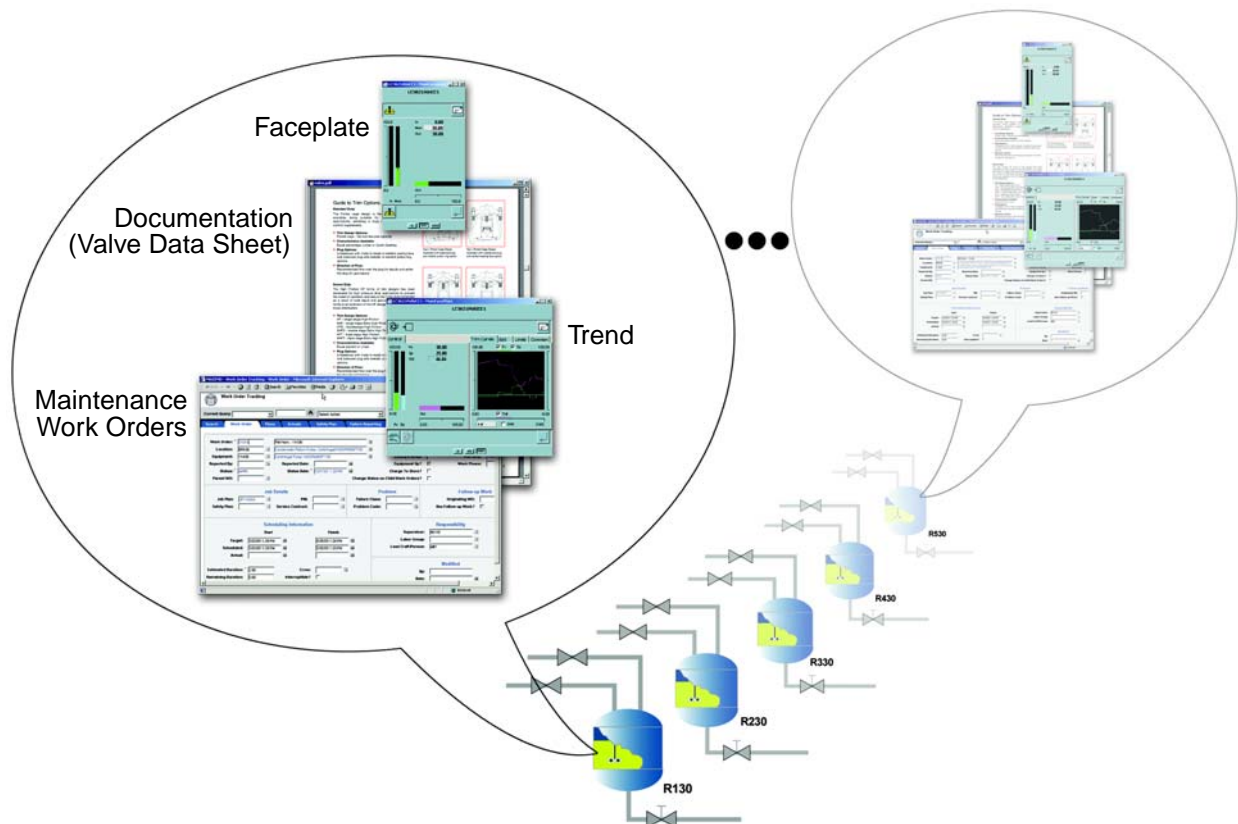
## Reusable Solutions

Consistency, reliability, availability and lower costs are the main goals of all automation system users. The key to achieving these goals is the ability to reuse knowledge or “best practice solutions” across multiple projects or organizations. The 800xA system provides a scalable, modular framework in which applications can be easily built from a comprehensive library of standard reusable components without having to be “re-engineered”.

Most reuse solutions address only process control strategy and their implementation. With System 800xA, solution standards also incorporate extended automation entities such as faceplates, graphic elements, trends, document links, CMMS data views, field device diagnostics, and asset monitors. Unlike other reuse solutions, System 800xA is not limited to loop level standards. Standards can be defined at any level across the entire plant, loop, machine, line, unit, and area. During the deployment of the functions, each object is adapted to specific needs. Using bulk data handling methods, items such as control parameters, tag names, trend rates, alarm limits, graphic elements, and I/O devices can be modified. Later during commissioning or operation, these object instances can be easily modified, by applying the change to the base object. Through inheritance features, each function is automatically updated to reflect the change.

System 800xA's reuse capabilities result in maximum engineering performance. Individual benefits include:

- Reduced engineering
- Improved quality
- Reduced maintenance
- Proven, consistent and flexible solutions
- Best-in-class enterprise-wide deployment



**Figure 6.** Reuse of a Reactor Including all Involved Objects and Aspects

## Bulk Data Management

The ability to efficiently manage large amounts of data is a crucial part of any automation system. The 800xA system meets these requirements through a tight integration with Microsoft® Excel. By using a series of Excel add-ins, the bulk data management features couple the full productivity benefits of Microsoft Excel with System 800xA.

The basic bulk data management functionality allows users to configure a worksheet to read and write aspect and object properties, supporting an iterative analysis and design process. In addition, the bulk data management features allow the import and assignment of external data such as signal lists, tag names or documents. System data can be exported at any time to simplify data validation and modification.

The track changes function provides the ability to compare two sets of data in order to identify changes. This function allows users to check for and introduce changes in a controlled manner.

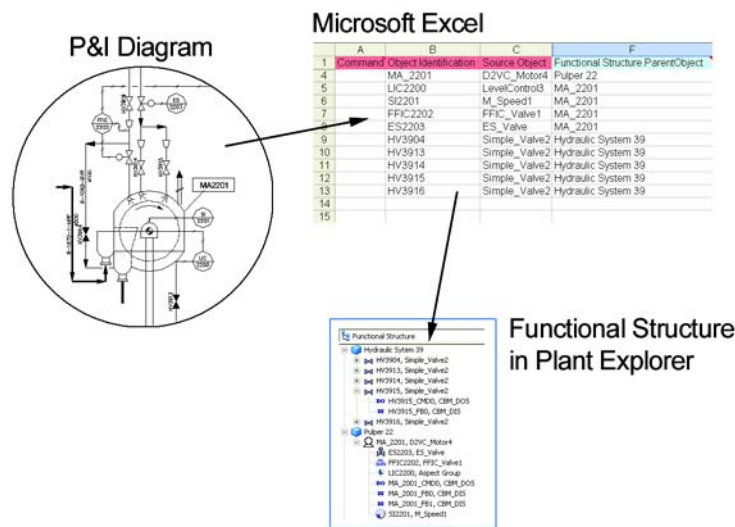


Figure 7. Automatic Creation of Functional Structure Through Import of Customer Data

## Process Visualization

### Graphic Displays

800xA Process Portal's graphical interface is based on ActiveX<sup>®</sup> 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.

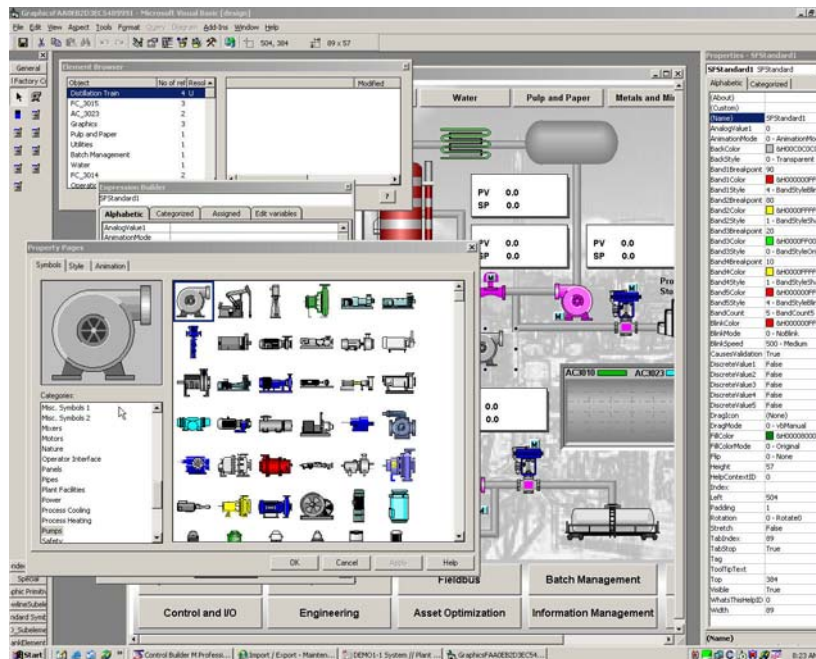


Figure 8. Create Graphic Displays for 800xA Process Portal

### 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.

## Change Management

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Effective change management enables businesses to meet evolving business needs. Within an automation system, changes to system configurations must be carefully controlled to ensure all modifications are traceable.

With the 800xA system, users are able to build their own library and maintain it with complete lifecycle management. Libraries can be released in different versions, so that during the engineering phase an installed library version can be substituted with a newer version. The inheritance capabilities of System 800xA will ensure that all instantiated solutions created with a previous version of the library will be automatically updated to the newer version. The result is better quality and improved engineering and maintenance efficiency.

In addition, System 800xA provides the ability to synchronize the runtime system content with the offline engineering content in a flexible, user controlled manner. All modified objects will be updated during the synchronization process. If an object is missing in one location, it will be created automatically. Audit trail events are generated for all changes made during the synchronization process.

System 800xA provides complete audit trail and electronic signature support for those industries that require regulatory compliance. Details are described in the 800xA Batch Overview.

## Plant Documentation and Diagnostics

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The availability of up-to-date plant documentation is crucial to the success of an operating plant. The integrated environment of the 800xA system provides the ability to associate documentation with related equipment or applications. For example, from a function diagram a control loop's electrical P&ID drawing can be accessed via a single mouse click.

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.

### **Interactive Operator Instructions**

From a plant perspective, interactive procedures ensure consistent operation and maintenance on non-routing tasks independent of the user's level of experience. In the case of a boiler restart, the operator is supported by an interactive instruction specific to boiler startup procedures. The interactive instruction includes links to involved process displays or faceplates as shown in [Figure 9](#). Therefore, the operator can quickly navigate to the related displays and start the boiler safely and effectively.

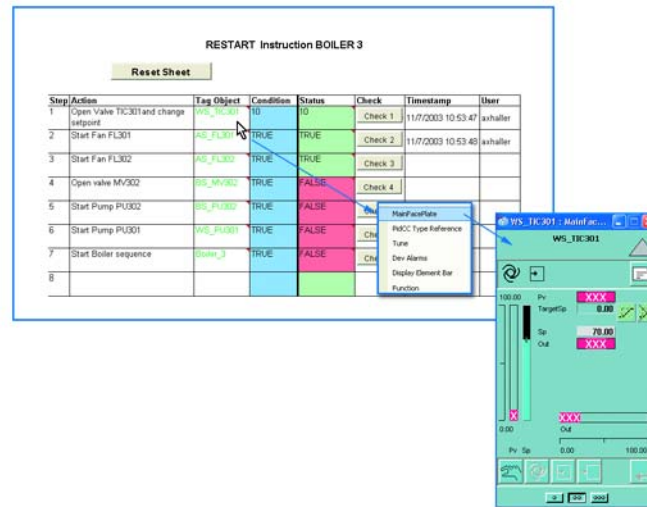


Figure 9. Interactive Operator Instructions for Easier Diagnostics

## Consistent up-to-date Documentation

During the engineering phase, large quantities of documents and data accumulate. In traditional systems, it is often not possible to integrate interactive documentation. Equipment data such as part numbers, price, and supplier for example, remain on paper copies and require manual intervention for updates. In this scenario, documentation becomes inconsistent and out of date almost immediately. What is needed is an effective method to create and integrate interactive documentation.

With System 800xA, documentation remains up-to-date and consistent through the use of dynamic documentation. Mapping a system object to a document reference facilitates automatic documentation updates. Once created and stored, actual information is then available everywhere for further use or modification. An example is an article number, which is used inside multiple documents such as parts lists, maintenance instructions, or work orders. When the article number changes, the related documents will automatically update. This enables the use of dynamic parts lists. Figure 10 shows an example.

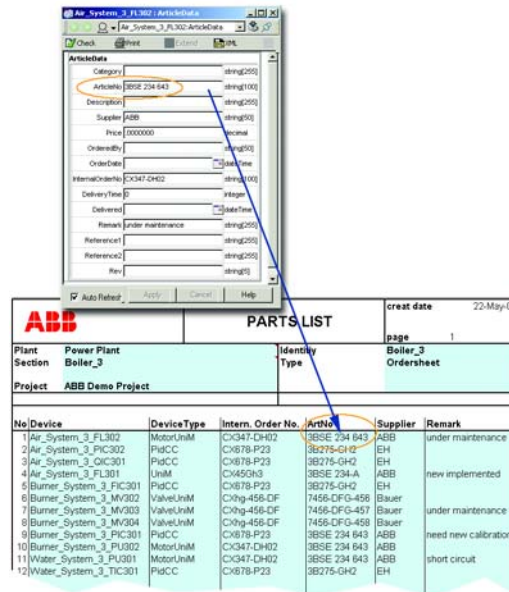


Figure 10. Consistent Update of Article Data in Related Documents

## Diagnostics

800xA Engineering's topology viewer serves as an overview of system component status, and as an entry point to more detailed device status information.

The topology viewer provides automation system status information including all communication links, controllers, nodes, and process I/O boards. The viewer has the following features:

- Self configuring topology diagram that includes the status of the hardware for example, controllers and I/O boards, and software.
- System diagnostic displays in the Operator Workplace to display status of local networks and nodes.
- Topology diagrams provide connection to both 800xA Alarm & Events and System Messages.

For diagnostics of field devices, 800xA Fieldbus Management tools are involved. See the 800xA Fieldbus Overview for details. .

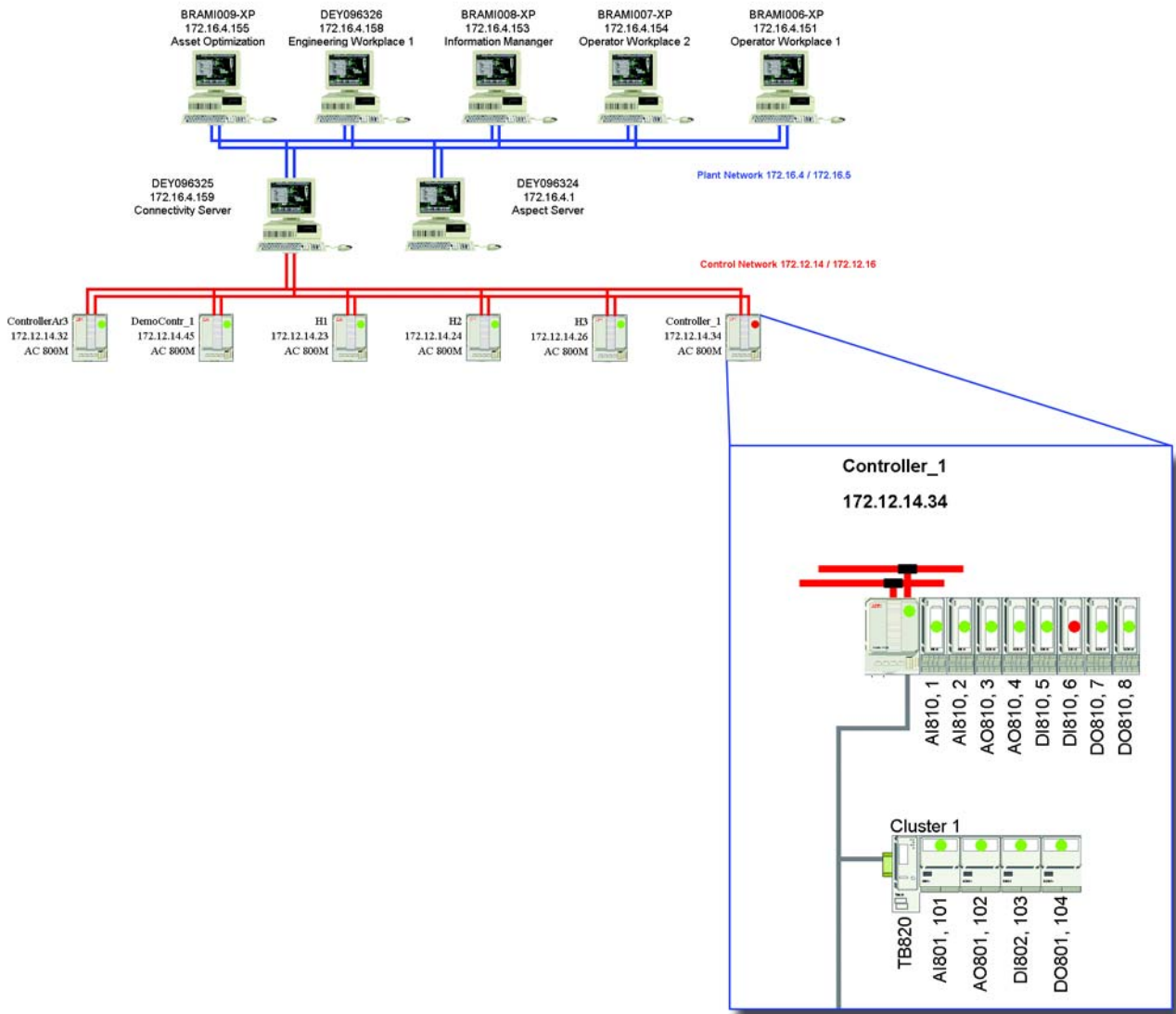


Figure 11. Topology Viewer

## Professional and Developer Engineering Tools

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800xA Engineering includes an optional advanced feature set that provides additional levels of productivity enhancements.

### **Reuse Assistant**

Extends the 800xA Engineering reuse capabilities. The tool uses a knowledge based question and answer wizard to assist the user with the implementation of predefined control solutions.

### **Script Manager**

Provides the ability to write scripts, which utilize the 800xA automation interface. Through the use of scripts, users can

- perform extended logging and tracing
- create user application specific dialogs and menus
- develop dependencies between objects and structures
- execute scripts manually or automatically based on event
- trigger scripts on events or changes.

### **HART DTM Builder**

HART DTM Builder can be used to create device-specific DTMs with graphical user interfaces. It supports user or vendor specific adaptation of the Basic HART DTM for more specific device commands and graphic dialogs. Details about DTMs are described in the 800xA Fieldbus Overview document.

### **Aspect Express**

Aspect Express is a tool for developing System 800xA integrated applications. A step-by-step wizard turns ActiveX controls developed in Visual Basic into aspect systems. The aspect systems can then be packaged and distributed as installable products.

### **Aspect Studio**

Aspect Studio is a comprehensive set of tools for developing System 800xA integrated applications. It contains tools both for programming support and software management.



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