System 800xA Facility Automation Solution
Application Overview

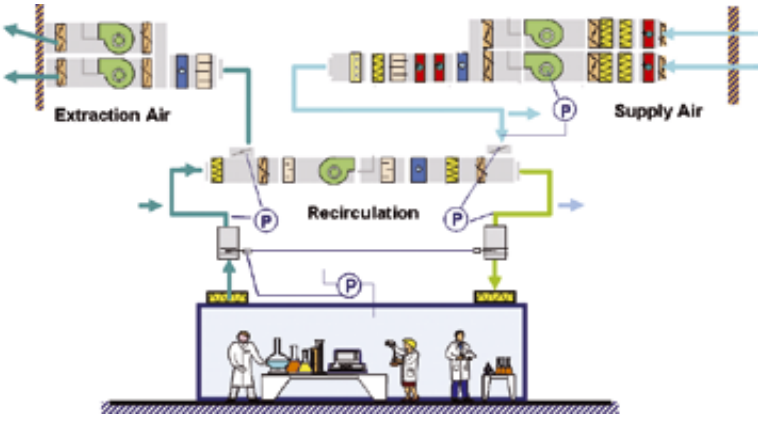
Features and Benefits

- **Reduce compliance reporting and validation costs:** A reusable, pre-configured and pre-tested solution that provides significant benefits both in project deliverables and plant operations. Users can achieve 10– 15% savings on compliance reporting and validation costs.
- **Common Platform:** A common 800xA System platform across the process automation and facility automation areas reduces costs associated with project engineering, commissioning, qualification, training, documentation and maintenance; thereby reducing the total cost of ownership.
- **Lifecycle Management:** PCEquipmentLib is maintained by ABB throughout its lifecycle. A rigorous methodology supports lifecycle development and maintenance. Global customers achieve consistency while having their intellectual investment (i.e. application) protected.
- **Industrial HVAC:** This is a FDA 21 CFR Part 11 compliant solution which is the industrial equivalent of functionality found in modern, high-end, commercial grade building management systems (BMS).
- **GMP and non-GMP:** System 800xA Aspect Object technology means the solution can easily be partitioned into Good Manufacturing Practice (GMP) and non-GMP configurations while gaining all the efficiencies associated with a single automation platform.

Application Overview

More and more today there is a demand for validated facility automation systems. Industry watchers also see the trend toward the consolidation of process and facility automation systems into a single unified platform. Advantages of this consolidated approach include a simplified combining of key environmental data into the batch production record as well as the efficiencies associated with use of a single automation platform.

ABB's Facility Automation Solution (FAS) addresses the needs of all large enterprises and is particularly well-suited to pharmaceutical and biotechnology applications. It provides a library of pre-defined object types which can be used during rapid deployment of the solution. The solution is concerned with maintaining the physical environment of the manufacturing area in a known state. It makes it possible for customers to report accurately on the environmental conditions during and after the manufacture of a particular batch along with the ability to verify who took any actions that may have affected those conditions.

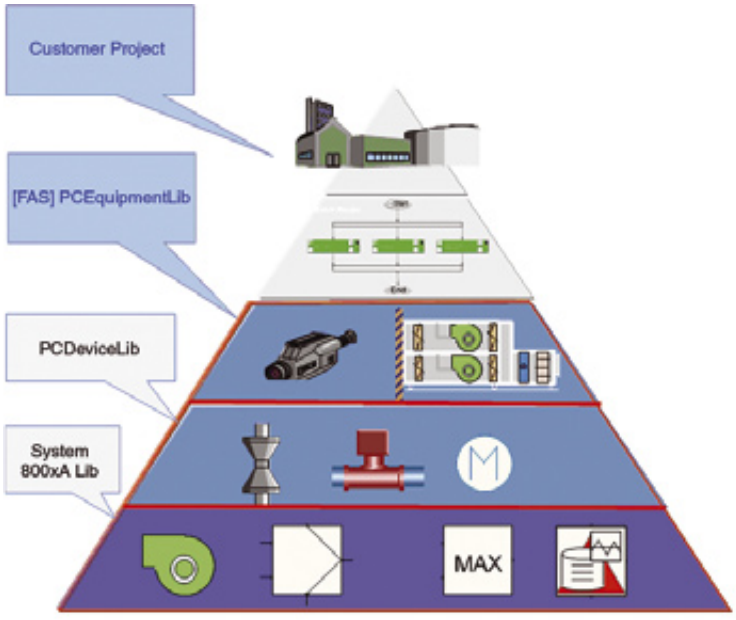


Overview of an Industrial HVAC System

The solution is built upon System 800xA. Being scalable, it is capable of controlling the critical functions of a single zone, an entire building, a facility or campus or the complete enterprise. Customers with either the desire to innovate, high cost / performance pressures or setting out on new investment programs will gain most from this solution.

Library Components

The Facility Automation Solution (FAS) provides pre-configured and pre-tested application components for monitoring and control of the major components of a life science facility such as air handlers, chillers, etc. It builds upon System 800xA, PCDeviceLib and PCEquipmentLib to provide additional functionality and greater engineering efficiency.



Facility Automation Solution (FAS) Library Structure

The FAS consists of components including base objects (i.e. scheduler, and enthalpy calculation modules) and templates which can be copied and modified by the project team.

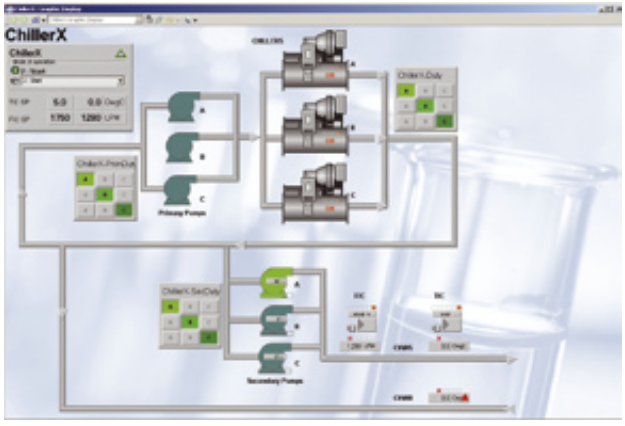
Pre-engineered, Pre-tested Templates

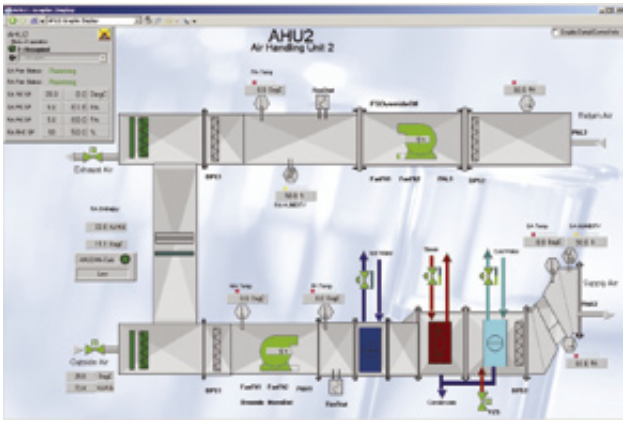
Encapsulating devices into templates makes the reuse of complex packages of device control simple, accurate and repeatable. Equipment templates combine one or more control devices into a common function such as an air handler unit (AHU) for a supply (or supply and recirculation) system, a chiller system with automatic lead/lag function, zone monitoring, etc. These in turn, can be used across several applications to provide a high degree of re-use, ensure operating consistency throughout the plant and reduce engineering and testing efforts. Additionally, the standard set of delivered templates can be copied and modified to meet specific project requirements.

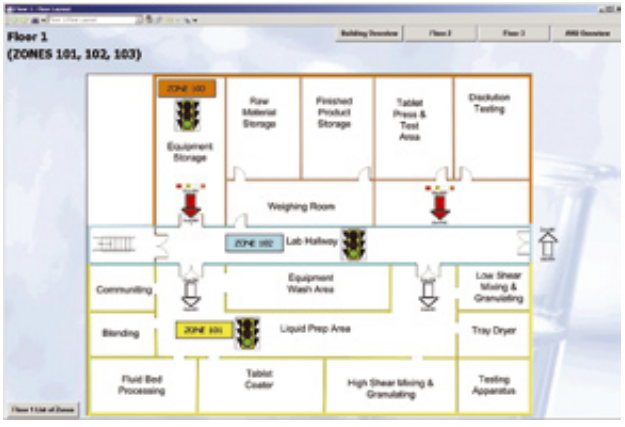
The standard set of pre-engineered, pre-tested templates included in FAS, is comprised of:

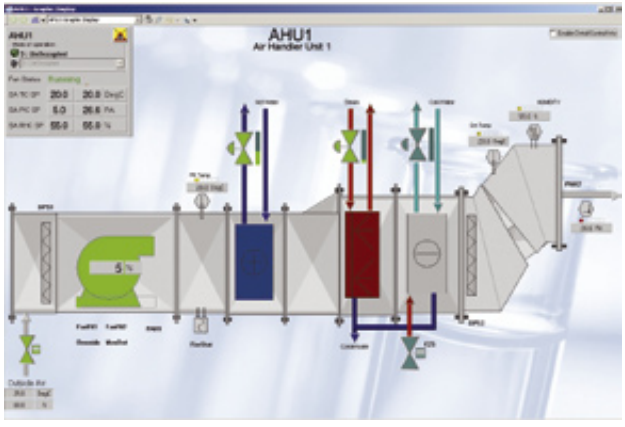
- Various air handling units (supply, supply and recirculation, etc.)
- Zone monitoring objects (monitor only, monitor & temperature control, etc.)
- Utility objects (chillers with primary and secondary pump sets, etc.)
- Advanced automatic lead/lag, duty/standby switching for on/off or variable speed motors
- Overall facility startup/shutdown sequence template
- Operational and compliance reports
- Scheduler

Facility equipment may utilize simple state engines or complex sequential logic to drive the transitions between different modes of operation (MOP). The mode of operation can be commanded by different applications, schedulers, or by an operator utilizing manual control. Alternatively, the mode of operation of the facility equipment can be commanded by the process batch recipe.









Three facility equipment views and a building layout overview

Base Components

In addition to delivering a standard set of templates, FAS provides a toolkit of pre-engineered and pre-tested base components to assist with rapid configuration of facility automation applications. These base components are control objects, graphic objects, graphic elements, faceplate elements, trend displays, group displays and/or bulk engineering templates.

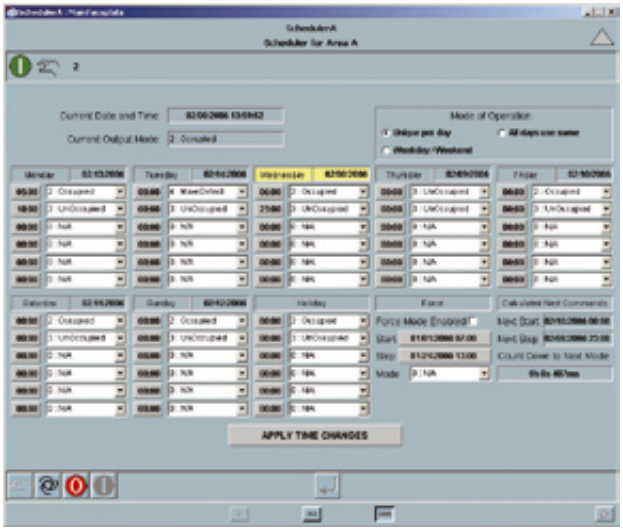
Toolkit base components include:

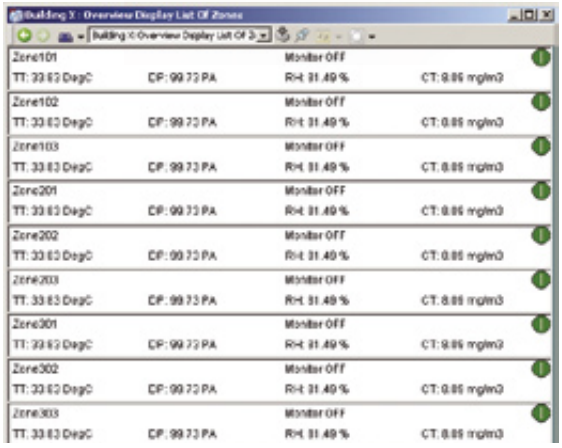
- Calculations for airflow, differential pressure, enthalpy, dew point temperature and mixed air
- PID loops (damper loops, cooling loops, heating loops, cascade loops, etc.)
- Schedules (7 day, holiday [one year ahead] and optimizer)
- Temperature state driver
- Graphic tools and displays (graphic elements for base objects, list of air handler units (AHUs), list of zones, graphic displays of floors, buildings and sites)
- Parameter management templates for bulk engineering and operation of AHU's, zone monitors, chillers, schedulers and facility startup sequences

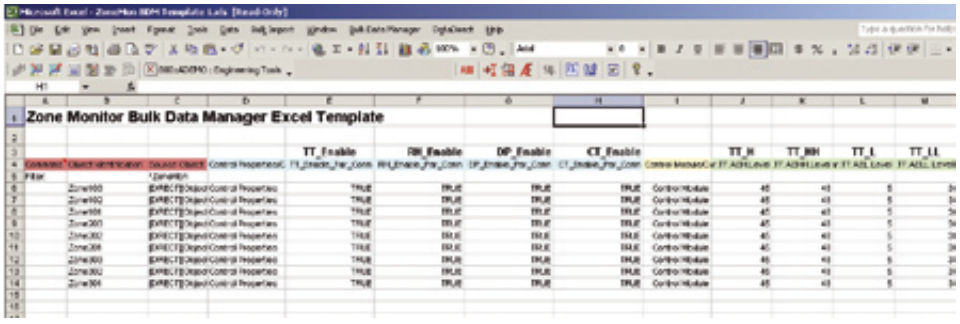
Common Environment

The reuse of pre-engineered, pre-tested and fully documented FAS components in your application provides many benefits:

- It facilitates a common engineering and operational look and feel across the entire facility. FAS (part of PCEquipmentLib) dovetails into existing ABB industry libraries like PCDeviceLib and PCEquipmentLib
- Decrease implementation time and reduce maintenance cost by minimizing documentation and testing efforts
- Common human sytem interface (HSI) concepts across the entire plant
- Full integration with the 800xA Aspect Object architecture, including access to logical color definitions, Native Language Support, alarm and event handling and security and audit trail models







Examples of operator interfaces and templates

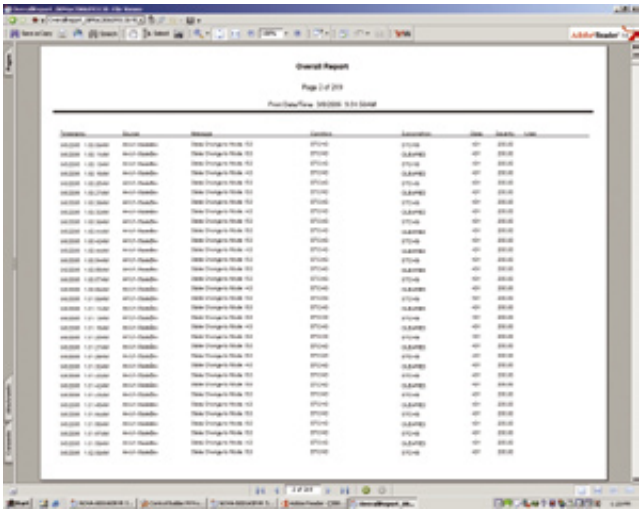
Reports

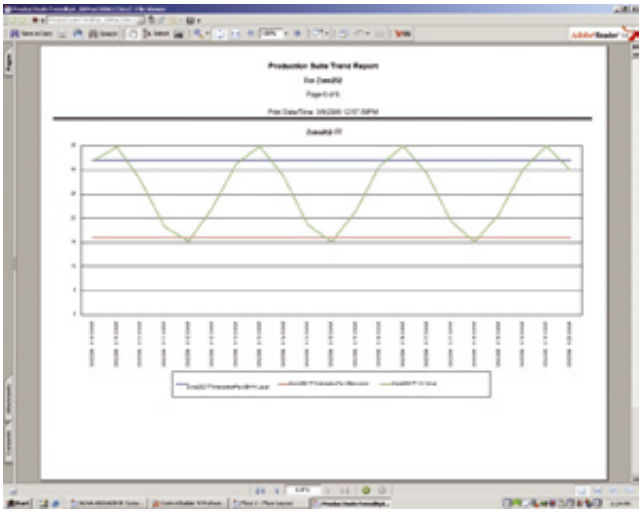
The FAS solution provides pre-configured reports which integrate information from various sources to support operational and compliance reporting needs. Included as standard are reports for end of shift, end of day, end of week or end of batch. These contain process variables and alarm data from the manufacturing environment (for example: AHU data, temperature, humidity, pressure, mean kinetic temperature). These reports are also configurable to include data from the Process Automation System (PAS) and / or PLC/SCADA systems on skids and sub-system data (fire detection, life safety, security/access control systems, etc.).

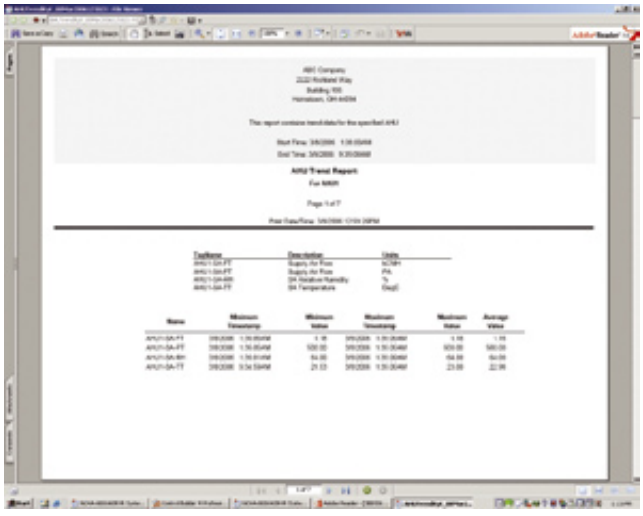
The reports are built in a generic manner using parameterization to facilitate ease of use. In addition, the report templates can be copied and modified to meet project specific requirements. The report output can be in various formats and can be stored as an object in the system with associated archiving and digital signature functions.

- **Overall report:** All events for a specified area (Good Manufacturing Process, or GMP, non-GMP, utility, etc.)
- **Exception report:** All critical events for a specified area (GMP) and trend displays for defined AHUs and zones
- **AHU trend report:** Trending of process variables for one air handler unit
- **Production suite report:** Trending of process variables for one zone or production suite (including temperature, pressure, humidity, particle count, number of excursions, excursion time, total time in excursion, etc…)

Managers are given the ability to have this data and other Key Performance Indications (KPIs) formatted on an Excel spreadsheet rather than a report or trend if that is their data display preference.







Screen shots of pre-configured reports

Conclusion

ABB's Facility Automation Solution provides pre-engineered and pre-tested modules that make it possible for users to control, manage and report environmental conditions during and after manufacture of a particular batch, while verifying who took actions affecting those conditions.

For more information on ABB control systems, contact your local ABB representative or visit www.abb.com/controlsystems. For more information on ABB's Life Sciences products, solutions and services, contact your local ABB representative or visit www.abb.com/lifesciences

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