Industrial IT
Compact HMI 800
System Version 4.1

Product Guide

Industrial IT enabled

ABB

Industrial^{IT}
Compact HMI 800
System Version 4.1

Product Guide

NOTICE

The information in this document is subject to change without notice and should not be construed as a commitment by ABB. ABB assumes no responsibility for any errors that may appear in this document.

In no event shall ABB be liable for direct, indirect, special, incidental or consequential damages of any nature or kind arising from the use of this document, nor shall ABB be liable for incidental or consequential damages arising from use of any software or hardware described in this document.

This document and parts thereof must not be reproduced or copied without written permission from ABB, and the contents thereof must not be imparted to a third party nor used for any unauthorized purpose.

The software or hardware described in this document is furnished under a license and may be used, copied, or disclosed only in accordance with the terms of such license.

This product meets the requirements specified in EMC Directive 89/336/EEC and in Low Voltage Directive 72/23/EEC.

Release:	October 2005
Revised:	February 2008
Document number:	3BSE041037R4201/F

TRADEMARKS

All rights to trademarks reside with their respective owners.

TABLE OF CONTENTS

Section 4 - Operations

Section 5 - Engineering

Section 6 - Communication Network

Section 7 - System Management

Section 8 - Technical Data and Performance

Section 9 - Ordering and Licensing

INDEX

Section 1 Introduction

Welcome

This Product Guide describes the Industrial^{IT} Compact HMI 800.

Intended Use of This Book

Target Group

This Product Guide is primarily intended to provide sales representatives with an overview of the product and its capabilities.

Industrial IT Compact HMI 800

The Industrial IT Compact HMI 800 is a comprehensive HMI for process control and supervision in the PLC market. It covers operation and configuration of almost all types of control applications.

The Compact HMI 800 is a comprehensive HMI that is delivered ready to be used out of the box. A delivery includes both hardware and software, the software is installed in one or more PCs which are ready to be powered-up and then the system is running.

A Compact HMI 800 system consists of the following main parts:

- One Server Workplace with Operation and Engineering functionality
- Up to four Additional Clients with Operation functionality.

The smallest system configuration is one node, the Server Workplace. It can then be expanded with up to four client workplaces. The system is also scalable in size. The size scaling is defined by the number of communication signals and tags that are allowed in the system.

These are purchased in packages including both signals and tags. For each tag is 2.5 signals included in a package. Packages are available for 50, 500, and 2500 signals (these also includes the corresponding number of tags: 20, 200, and 1000).

The Compact HMI 800 products have been developed incorporating Information Technology with the experience and know-how collected over decades of successful deliveries and customer installations.

The foundation of the Compact HMI 800 products and system solutions is the concept of Aspect Objects™, which enables enterprise wide information availability, browsing, and navigation in a unified way.

The Compact HMI 800 is delivered installed and preconfigured on standard PC hardware. The Compact HMI 800 can be used as a single PC workplace or as a server workplace combined with four additional client workplaces.

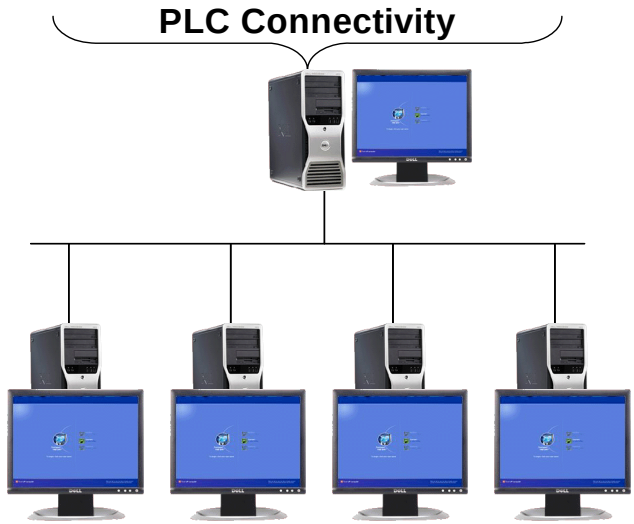


Figure 1. Compact HMI 800 System

The information resides in an integrated environment configurable for various user needs. The user interface can be used with default settings or be customized providing user categories, such as operators, engineers, and maintenance personnel, all with an environment focused on their main tasks.

As a result, the user can concentrate on the right actions, with a minimum of effort, resulting in increased productivity.

Within the Compact HMI 800 there are a number of Core Functional Areas. These are:

- Core System
- Operations
- Engineering

These Core Functional Areas are described in section 3.

Compact HMI 800 can be used together with AC 800M or with any other PLC. The controllers are accessed using the OPC standard interface.

Purpose, Scope and Intended Use

The scope of the Compact HMI 800 described in this document is:

- Traditional process automation, as well as hybrid automation. The control level ranges from simple binary control to closed loop control.

Aspect Objects Architecture

The Aspect Objects architecture is a cornerstone of the Compact HMI 800 concept. It provides:

- A consistent, scalable concept that integrates Process Control & Automation products.
- Information-centric navigation – a consistent way to instantly access all information without having to know how and by which application the information is handled.
- Integration of autonomous applications. Very little awareness is required between applications.
- Easy integration of new aspect systems (new applications). A homogeneous base for all applications. Open standards make it possible for users to integrate new aspect systems.

- High level of engineering efficiency through data integration between aspect systems.
- Extensive re-use during the life cycle. For example copy/paste, definition of object types and solutions, etc.

A central problem in plant operations, as well as asset life cycle management, is the need to organize, manage, and have access to information for all different aspects of a great number of plant and process entities. These entities, or real world objects, are of many different kinds. They can be physical process objects, like a valve, or more complex, like a reactor. Other examples are: products, material, batch procedures, manufacturing orders, and customer accounts.

Aspect

Each of these real world objects can be described from several different perspectives. Each perspective defines a piece of information and a set of functions to create, access, and manipulate this information. We call this an *aspect* of the object.

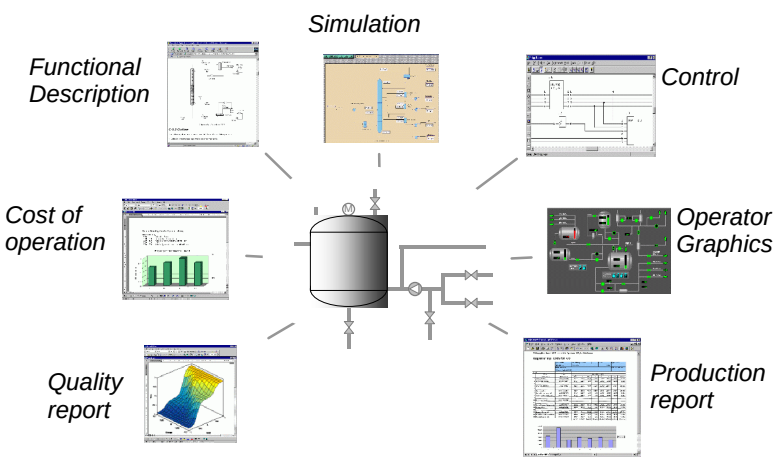


Figure 2. Examples of Different Aspects of an Object

Aspect System

A software system that implements one or several aspect types by providing one or several aspect system objects.

It is necessary to be able to implement these aspects using many different applications, both existing and new, from ABB, third parties and customers, both now and in the future. It is desirable to be able to do this without changes to the applications. It is not reasonable to require that all these different applications be aware of each other. Still, the applications must cooperate to provide an integrated view and functionality of the object.

Aspect Objects

Aspect Objects provide a solution to this problem. In this concept, rather than creating one single object or data model in the system to represent the real world object, each aspect is modeled separately. An *Aspect Object* is thus not an object in a strict sense, e.g. like a COM object, but rather a container of references to implementations of the different aspects.

Terminology

This list contains descriptions for terms and abbreviations that are used in this document.

Table 1. Terms and Definitions

Term	Description
ActiveX	Microsoft standard for user interface components, based on definition of software interfaces.
AS	Aspect Server. The “central” intelligence in the system, including the aspect directory and other services related to object management, names, security, etc.
Aspect	See Aspect on page 12
Aspect Objects	See Aspect Objects on page 13
Aspect System	See Aspect System on page 13

Table 1. Terms and Definitions (Continued)

Term	Description
CEXbus	Communication module expansion bus used in the AC 800M Controller.
CNCP	Control Network Clock Synchronization Protocol
COM	(Microsoft) Common Object Model.
CS	Connectivity Servers provide access to controllers and other data sources.
CTK	Configuration Tool Kit
DCS	Distributed Control System. A generic term for control systems for Process Automation, normally with a distributed database and real time data access.
DCU	Distributed Control Unit
DMZ	Demilitarized Zone
DTM	The Device Type Manager - DTM - is a software module delivered by the manufacturer together with a device. As an “FDT device driver” the DTM contains all device-specific data, functions, and graphical user interfaces and provides uniform access to these device-specific internals via the standardized FDT interfaces.
ECCP	Ethernet Communications Controller for the PCI bus
EPA	Environmental Protection Agency
ERP	Enterprise Resource Planning.
ES	Engineering System, which is used for engineering and potential test of applications intended for Production System
FDA	Food and Drug Administration
FDT	Field Device Tool. It is an open standardized communication interface for integrating field devices and their application into control systems or device management tools, e.g. Engineering Tools and Asset Management Tools.

Table 1. Terms and Definitions (Continued)

Term	Description
FF	FOUNDATION Fieldbus.
GSM	Global System for Mobile communication
HSE	High Speed Ethernet (FOUNDATION Fieldbus)
HSI	Human System Interface
HMI	Human Machine Interface
Industrial^{IT}	Industrial^{IT} is ABB's solution that creates a business enterprise where your plant automation, Asset Optimization, and collaborative business systems are seamlessly linked in real time.
MES	Manufacturing Execution System
NIC	Network Interface Card
NLS	National Language Support
Node	A computer communicating on a network, e.g. the Internet, Plant, Control or I/O network. Each node typically has a unique node address with a format depending on the network to which it is connected.
ODBC	Open Data Base Connectivity
OCS	Open Control System. Similar meaning as DCS
OLE	Object Linking and Embedding
OPC	OLE for Process Control, a standard interface for data, event and history access based on COM.
PA	Process Automation
Plant Explorer	An application that is used to create, delete and organize Aspect Objects and Aspects in the Compact HMI 800. The plant explorer organizes the Aspect Objects in structures according to functionality, location, etc. You can also use it to browse and search the structures of the plant.

Table 1. Terms and Definitions (Continued)

Term	Description
PLC	Programmable Logic Controller. Controller for primarily discrete logic control.
PNSM	PC, Network and Software Monitoring
PS	Production System which is used for controlling a real process
RNRP	Redundant Network Routing Protocol
SIL	Safety Integrity Level
SIS	Safety Instrumented System
SMS	Short Messaging Service
SNMP	Simple Network Management Protocol
SNTP	Simple Network Time Protocol
SOE	Sequence of Events
SQL	Standard Query Language
UTC	Coordinated Universal Time
VPN	Virtual Private Network
WMI	Windows Management Instrumentation

Applicable Standards and Specifications

Openness provides solutions that enable and protect the future growth of the system. To utilize this openness, Compact HMI 800 conforms to standard technologies like OPC, Microsoft COM, ActiveX, IEC 61131-3.

The following table list the major standards incorporated into or supported by Compact HMI 800.

Table 2. Standards

Standard	Description
ActiveX	Microsoft standard User Interface
COM	Microsoft standard
DIN EN 500 22	Standard for DIN rail used by Module Termination Unit
EMC Directive 89/339/EEC	CE Compliance Directives (standards; EN 61131-2, EN 50081-2, and EN 50082-2)
FDT/DTM	Concept for fieldbuses
IEC 61131-3	IEC Standard for programmable controllers
IEC 61508	IEC Standard for SIL1-2
IEC 61512 (ISA S88)	IEC Standard for Batch Management
IEEE 802.3	Ethernet
ISO-9506	Standard for sending information between industrial applications.
Low Voltage Directive 73/23/EEC	CE Compliance Directive (standards; EN 50178, EN 60950, EN 61010, EN 50178, EN 60439, or IEC 60255, depending on product)
OLE DB	COM based application programming interface (API) for data access
OPC	OLE for Process Control. Standard for standard data, event, and history access based on COM
S95	The ISA S95 Standard for Enterprise-Control System Integration defines interfaces between applications at the Industrial Control Level and applications at the MES (Manufacturing Execution Systems) Level
TCP/IP	Defacto standard for computer networking

Related Product Guides and Release Notes

The list below specifies the available Appendices and Product Guides describing related products and Controller Connectivity.

Table 3. Appendices for related products and controller connectivity

Title	Document Identity
PLC Connect	3BSE038018R4101 Appendix E
Compact Control Builder SV 4.1 Product Guide	3BSE039837R201

For references to concerned price lists, see Price List Structure on page 90.

Section 2 Key Benefits

Industrial IT Compact HMI 800 extends the reach of the traditional automation systems beyond control of the process to achieve the productivity gains necessary to succeed in today's business markets. For the first time, this scope is accessible from a single user interface that is configured to present information and provide interaction in a context appropriate to all user disciplines.

Compact HMI 800's unique operating environment allows the incorporation of "best in class" products, applications and services from the world's largest automation supplier. Built on the Industrial IT Aspect Object™ technology platform and industry specific expertise, ABB's automation portfolio provides the seamless link between process and business management to deliver knowledge-based solutions.

Features and Benefits

- **Full functionality**: Including dynamic graphics, event and alarm handling, graphic trending, historical data storage, reporting, faceplates, etc., etc.
- **Open to any controllers**: Supports the OPC standard, meaning that it is directly interfaceable to the large and growing number of OPC-compliant controllers. Drivers are also available for the most popular, non-OPC-compliant PLCs.
- **Pre-installed**: Delivered as a complete system with factory installed software.
- **Easy to Engineer**: Delivered preconfigured and ready for plant- and process specific adaptation.
- **Easy to Operate**: Intuitive point-and-click-style operation, to the Windows standard, from overview to detail and back.
- **Easy to Maintain**: Comes with built-in, automatic, back-up functionality.

Enhancing Reliability. Embracing the principles of open, real-time networking, Compact HMI 800 provides a scalable solution that spans and integrates loop, unit, area, plant, and interplant controls. From providing a secure foundation with robust, but flexible, base level regulatory and sequence control to higher level management and advanced control functions, Compact HMI 800s meet the application needs of a wide variety of industries.

Compact HMI 800 provides a secure, reliable, control environment through built in security features such as access control, user authentication, and audit trail capability. ABB enhances secure system operations by incorporating "safe design" practices into product development, and by providing Compact HMI 800 hardening settings.

Based upon the Aspect Object technology and a common set of hardware, Compact HMI 800 seamlessly integrates traditionally isolated control systems.

Compact HMI 800 delivers its extended productivity gains by:

- Reducing Time to Decision and Action
- Engineering for Maximum Performance

These key value propositions are described in the paragraphs below.

Reducing Time to Decision and Action

Compact HMI 800 delivers the exact information - filtering out the noise - to facilitate consistent, sound business decisions and provides the environment to optimize the associated response.

Compact HMI 800 Operator Workplace, each user's login defines the type and class of information required for timely and informed decision-making. Thus, Compact HMI 800 delivers much more than a comprehensive operator console; Compact HMI 800's personalized workplaces provide an intelligent and focused presentation, enabling rapid response.

Optimal reaction requires real-time knowledge that an upset has occurred, or will occur. Compact HMI 800 provides notification through its audible and visual alarm and event presentation. Remote personnel are notified of critical events via mobile telephones, e-mail accounts, and pagers by Compact HMI 800's SMS and e-mail messaging service. Using GSM mobile phone technology, Compact HMI 800 allows remote acknowledgement of notification and confirmation of receipt.

Compact HMI 800 features include:

- **Personalized workplaces for focused information access:** Workplace layouts are adjusted and optimized to user preferences and needs with individualized menus, toolbar contents, and display locations. At delivery a layout adapted for Compact HMI 800 is configured.
- **Intuitive and flexible navigation for fast information access:** Quick access with familiar web browser tools to displays and information is provided. Favorites, history lists, shortcuts, and hot buttons provide navigation through a process production facility quickly and accurately.
- **Comprehensive operator functionality for reliable control:** Compact HMI 800 Operator Workplace provides a complete set of operator functions that include realistic process graphics with standard faceplates, superior trending capabilities, intelligent alarm and event handling, production reporting, and remote messaging.

Engineering for Maximum Performance

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

Compact HMI 800 Engineering provides real-time information integration for better and faster access. Working within a common engineering environment, Compact HMI 800 Engineering supports a consistent information flow from design, through installation and commissioning, to operation and maintenance.

Compact HMI 800Compact HMI 800 helps users engineer for maximum performance with:

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

Compact HMI 800 Engineering features include:

- **Reusable Solutions**. 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. This is only valid for aspects inherited from object types, and for added new aspects.
- **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.** Documentation of all integrated components and devices are easily accessible.

Integration of Installed Systems

The Compact HMI 800 can also be used to enhance existing installations. Enhancement is based on a number of assumptions, which determine the connectivity and evolution capabilities.

Different levels of an automation system may have different lifetime cycles. The workplace and server level typically has the fastest development. The customer’s readiness to upgrade is also higher on workplace and server level than on controller and I/O levels. From this the following conclusions are made:

- New workplace and server products connect to existing PLC’s.
- New PLC’s connect to existing process I/O.
- A user´s investment in their application often has a larger value than the hardware and software investment. Hence, application conversion tools are provided to bring applications over from the existing to the new product.

Section 3 Compact HMI 800

Compact HMI 800 Overview

The Compact HMI 800 functionality is divided into a core system and a set of function modules. The modules represent functions that are needed for the process that shall be controlled. The modules are grouped in a set of Functional Areas for an easier overview of the complete product functionality.

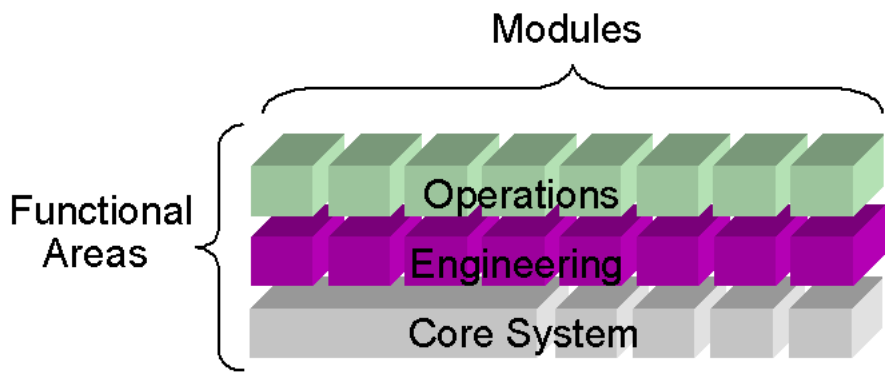


Figure 3. Compact HMI 800 Functional Areas

The Compact HMI 800 software structure is summarized as follows:

- Core System is the system base software. It consists of
  - Core System Functionality.
  - Integration of almost any controller via PLC Connect.
  - Real Time Data Client Connection, Audit Trail, Advanced Access Control, SMS and e-mail Messaging, etc.

- In addition to the Core System the following Core Functional Areas are defined:
  - Operations.
  - Engineering.

Core System

The Compact HMI 800 base functionality is comprised of the Core System consisting of:

- Plant Explorer for creating and maintaining Aspect Objects and object structures.
- Alarm and Event handling for detection, generation, and logging of alarms and events.
- Security for handling of user permissions and authority in the control system.
- System Time Synchronization to synchronize the system time in the different nodes (PCs and controllers).
- Backup and Restore, handling back up and restore of the Compact HMI 800.
- Export and Import of application data
- Localization. The Compact HMI 800 is available in US-English. The Core System has support for making the localization to other languages.

Plant Explorer

The Plant Explorer is used to create, delete, and organize Aspect Objects and Aspects within the Compact HMI 800. It organizes the Aspect Objects in structures according to functionality, location, etc. You can also use it to browse and search the structures of the plant.

Plant Explorer is the main tool used by engineers for exploring and building hierarchically structured models of a plant or system. It is based on a structural hierarchy, similar to Windows Explorer. The structures represent different views of the plant. Structures can be built and improved at any time. Examples of different types of structures are:

- Functional Structure
  Shows the plant from the process point of view. It is an overview of the functionality of items in the plant. It is used for operation of the plant.
- Object Type Structure
  Shows the object types that is the templates for the real objects. It is used mainly for engineering tasks.
- Control Structure
  Shows the control network in terms of networks, nodes, fieldbuses, and stations.

All the entities included in a plant are represented as objects; for example, valves, motors, controllers, and tanks. These objects have relevant information stored in aspects, as shown in Figure 4. For example process graphics, control dialogs, and alarm pages. In the figure the Aspect Object is in the left column and a list of the aspects connected to it is in the right column.

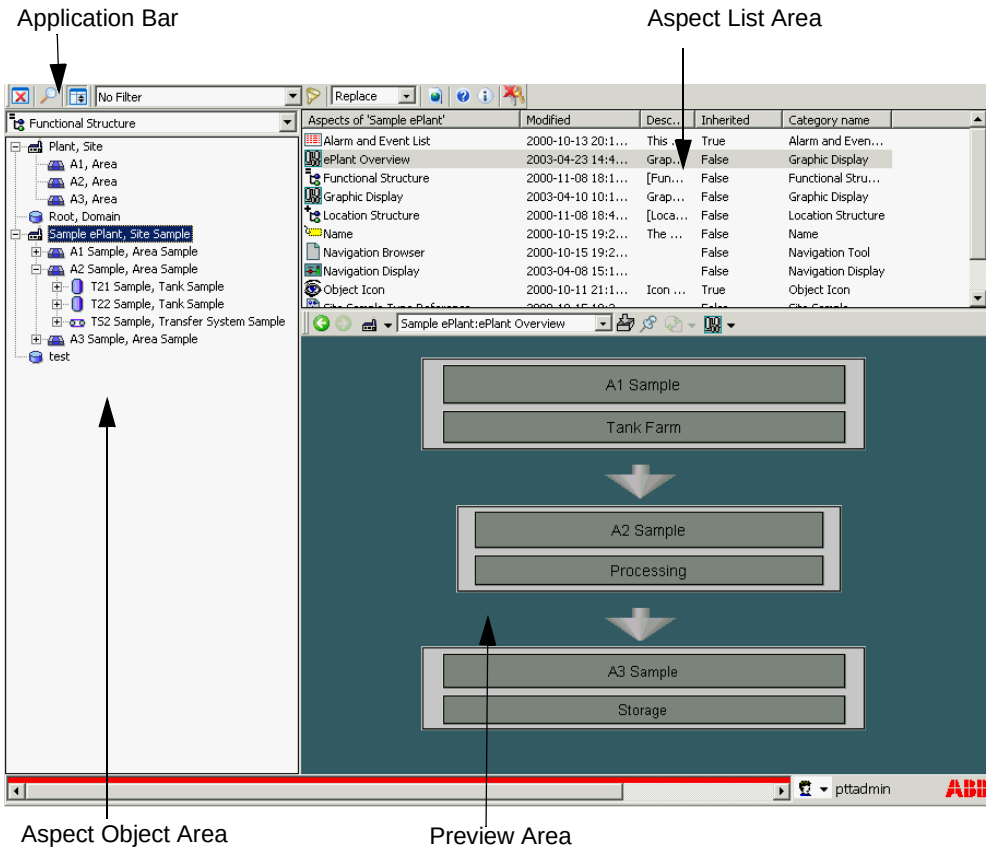


Figure 4. Example of the Plant Explorer window

Aspects have the following features:

- The aspect can be viewed in a pop-up window, in the preview area or in a full screen window.
- Aspect filters decrease the amount of information to be viewed.
- A search facility for finding a particular Aspect Object in any structure.
- The Aspect Object can also be directly accessed from the Compact HMI 800 Operator Workplace.

Alarm and Event

There is support for alarm & event management on several levels throughout the system. Alarms and events are treated in a consistent way (an alarm is an event that alerts the user of an abnormal state and needs to be acknowledged). The core system supports management and logging of events.

Supported levels of alarm & event management can be described as:

- Event detection provided on controller, field, and application level
- The core system supports storing and state management of events and alarms.
  - The Alarm Manager sets up subscription for alarms and events from event collectors in the Connectivity Servers. Events are sent to the System Message Server for retrieval purposes.
  - Redundancy is applied to the Alarm Manager, via several alarm servers that work in parallel, receiving the same alarms. One master exists which re-distributes alarms to the client. If the master goes down, another server becomes master. A synchronization of data with the current master takes place when a redundant Alarm server starts up after a failure.
- On the application level, Operator Workplace and history functions provide the presentation of alarms and events.
  - Alarm logger for printer output.
  - Alarm bands to provide a number of active and unacknowledged alarms in a summary display for selected alarm lists.
  - The Sequence bar displays a defined number of alarms horizontally. The alarms shown are the newest alarms from the defined list.
  - SMS and e-mail Messaging provides a method for sending messages based on alarm and event information to user devices such as mobile telephones, e-mail accounts, and pagers.
  - All client applications are applying filters which are configured as part of the alarm or event list to determine which alarms or events from the system global alarm or event stream shall be included in the client functions.
  - Alarm list configurations can be shared between lists.

– If an alarm is irrelevant it should not be shown in an alarm list. An alarm is irrelevant if it doesn't require an action from the operator. A function called hiding will help the operator to clear the alarm lists from irrelevant alarms.

The functionality provided by the Operator Workplace is described in the Operations Section.

The following picture, Figure 5 show the overall flow of alarms and events, starting in the AC 800M controller. Buffering of events takes place at several levels in the system. Such buffers, or queues, are shown. Presentation and acknowledgement can be made in several ways as discussed above.

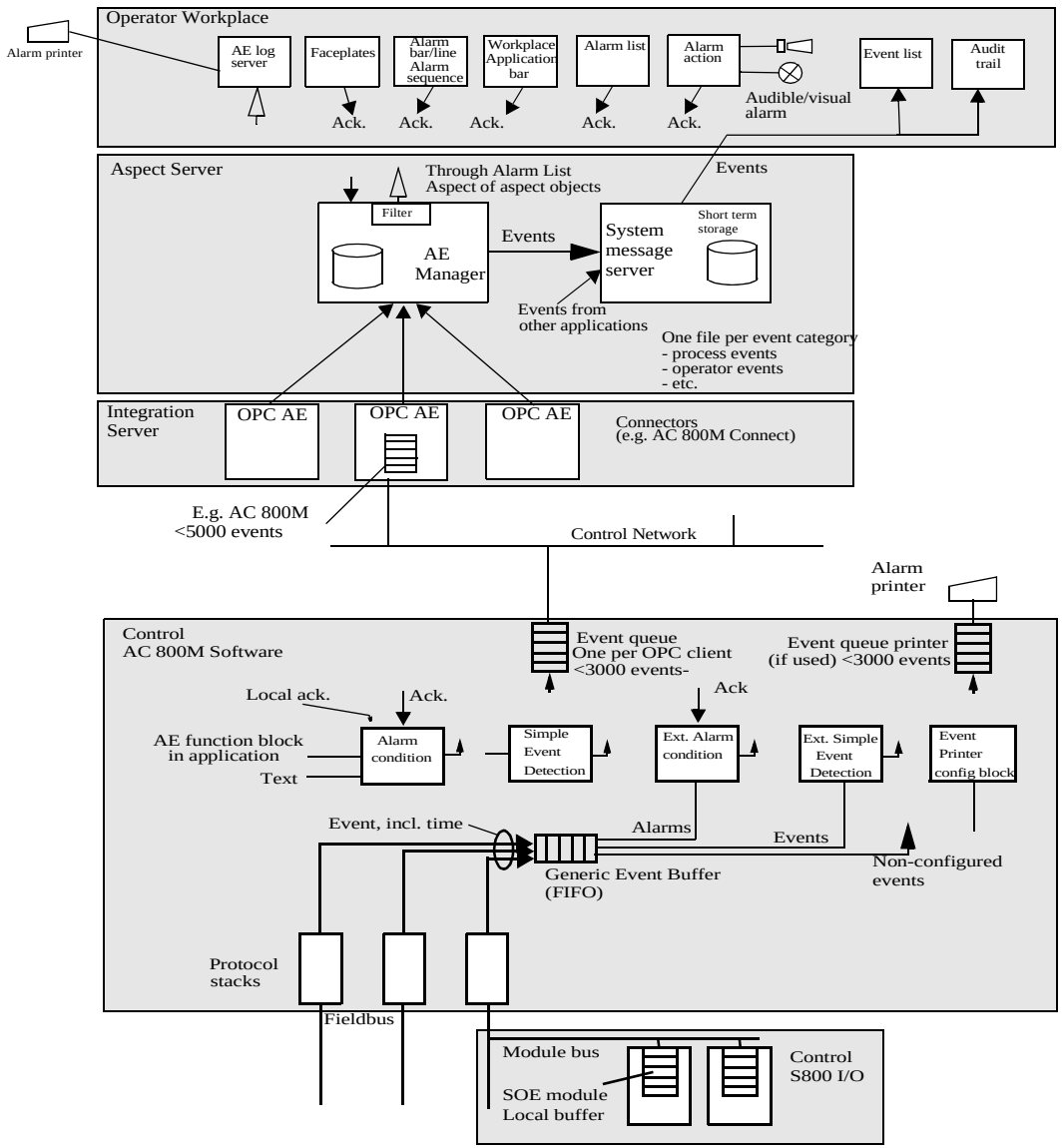


Figure 5. Alarm & Event management

Trend Logs

The ability to store, view, and retrieve process data and historical information is an integral function of the automation system. To accomplish this, the system provides scalable options to satisfy the information needs of all levels of users, including process operators, engineers, maintenance personnel, and operations managers.

The history system functionality is divided into Core System History functions, and Operator Workplace.

The history functions in the Core System are:

- Event storage (up to 50,000 events)
- Trend data storage (up to 2,000 logs)

Security

Operations/actions in the system can be assigned different required permissions. This assignment defines what permission a user needs to have in order to perform the operation/action. Examples of permissions are: Read, Configure and Operate. To execute a setpoint change, for example, Operate permission may be required. Each attribute of a control object can have a different permission assigned, so that access rights can be differentiated down to a particular operation to an object.

The foundation for Compact HMI 800 user administration is the Windows user administration. A user is registered in Windows, and can belong to one or more groups. The user group can be freely selected, but it may simplify user administration if the user groups correspond to the Industrial IT user groups.

Roles will control what is visible to a certain user group (here Industrial IT user groups apply). For example, Controller limits in the faceplate can be made invisible for an operator.

In the finest granularity, the above-mentioned functionality gives the administrator the possibility to define exactly who can do what and from where. The functionality can be applied to each aspect in the system at the same time in order to provide basic security with minimum setup.

The user groups are assigned different permissions relative to substructures down to an individual object. This supports the concept of users/ user groups having different authority for different areas of the system. Authority is set at an Aspect

Object in an arbitrarily selected structure, such as the functional structure. All subordinate objects inherit this authority. It is also possible to set authority explicitly for any single Aspect Object.

Default configurations of security are available to reduce the system configuration work.

User log-over

User log-over provides the ability to temporarily change users without a complete Windows logon/logoff sequence. This makes it much faster, for example, for another user to log in to perform tasks which require a higher authority level without logging off the current user. The information displays remain available.

Clock synchronization of Workplaces

System-wide time synchronization of all nodes handling time related data is supported. The AfwTime Service is used to synchronize the time on the server and client nodes defined in a system. This service can also be used to change the current time in the system.

The Time Service has two components, a Time Server and a Time Client.

- Time Server.

  The Time Server component is the administrator of the clock synchronization. It receives and distributes the clock synchronization telegrams to/from other nodes, and it makes the final decision on which telegram to accept and broadcast to the network. The clock synchronization telegram comes from the Clock Master (normally an AC 800M controller).

  The Time Server is normally active in the Connectivity Servers.

- Time Client

  A Time Client is responsible for keeping the date and time in its node updated and synchronized with the global time broadcast from the Time Server. It is also responsible for allowing or disallowing manual setting of date and time, according to how it is configured. A Time Client resides in all Compact HMI 800 nodes.

Daylight Savings Time is supported and handled as a presentation issue. The system time, the event detection, and the storage of events are done in universal time (UTC) in order to keep track of the correct sequences and across any time changes.

Windows Backup and Restore

Before backing up the system application data, the Windows system must be fully backed up. This can be performed with the included Symantec Ghost™ software or or Windows backup. The backup should include the system and all used system extensions.

In case of a disk crash you use the full Windows backup and the Windows Backup tool to restore the system to the same state as it was before the disk crash.

Compact HMI 800 Backup and Restore

The backup stores all Aspect Objects and aspect data to a disk at a configurable location. It also stores service data that is not stored in the Aspect Directory.

Backups are either full or incremental. The server workplace includes a second Hard Disk and a DVD writer to support the handling of the back-up data.

Backups are always made on a running system. They can be started manually or scheduled.

The Backup Restore function makes it possible to make an on-line backup of a node and perform an off-line restore to any node.

The Maintenance Structure contains the backup definitions as well as backups which have been executed.

The restore recreates a system equivalent to the original after a computer failure. It is also a recommended way to transfer data between one version of the system to another during an upgrade.

The Backup function is also used to create a complete System Configuration Version with an identity.

Export and Import of Application Data

The Import/Export tool is an instrument for storage and distribution of objects and aspects. An object and aspect structure can be saved and then imported into the same or another part of the structure. Data from the system, in the form of objects and aspects, can be imported and exported into archive files.

The system enforces that exported data contain all necessary data to fully restore the functionality of the exported objects. Data that the object function is dependent on will automatically be included, even if they belong to other objects or even other structures.

PLC Connect

PLC Connect provides an integration of PLC-controllers into the Compact HMI 800. This function makes it possible to access PLC based control functionality in a similar fashion to other integrated PLCs.

PLC Connect acts as an integrated controller integration towards Industrial IT Compact HMI 800. As a result, integration into the Industrial IT concept is achieved. PLC Connect thus makes it possible to configure the Compact HMI 800 as a hybrid PLC system.

ABB controllers that do not have a dedicated integration option available, are integrated into the Industrial IT Compact HMI 800 by means of PLC Connect.

PLC Connect adds traditional PLC type functionality as an integrated part of the Industrial IT concept. This means that traditional system capabilities, typically requiring a large number of process I/O:s to be connected through a range of controllers from different manufacturers, can be realized with an Industrial IT Compact HMI 800.

PLC Connect provides the following features:

- Basic object types for PLC type signals and softpoint signals.
- Configuration tools for creating and editing PLC type objects.
- A full set of faceplates for the PLC type objects.
- Integrated Real Time Database (RTDB) to keep an updated image of connected process points as well as calculated softpoints.

- Communication drivers.
- Dial Manager for remote communication.
- Alarms detection and OPC Alarms and Events generation for PLC binary signals.
- Alarm limit detection and OPC Alarms and Events generation for PLC integer and real signals.
- Open interface to PLC signals and softpoints from application programs in VB and C++.

PLC Connect is typically used in the following cases:

- For integration of AC800M/C Industrial IT Baseline 2 controllers when full DCS controller integration is not required.
- When remote connection of PLCs and RTUs are required.

System Options

FDA 21 CFR Part 11 Support

The US Food and Drug Administration (FDA) issued 21 CFR Part 11 in response to the pharmaceutical industry's request to utilize paperless record systems under the current good manufacturing practice (cGMP) regulations in parts 210 and 211 (21 CFR parts 210 and 211). Part 11 went into effect on August 20, 1997. The regulation does not require a manufacturer to maintain records electronically. However it does provide the criteria under which the FDA will consider electronic records to be equivalent to paper records.

The support of compliance to 21 CFR Part 11 is an absolute, non-negotiable requirement for automation products sold into manufacturing environments subject to FDA regulation. This is primarily a concern for manufacturers in the life science industry, but can also include food, beverage, and cosmetics manufacturers as well. Also some chemical and other manufactures who supply materials to the life science industry are required to comply with the regulation.

The requirements for Compact HMI 800 to enable compliance have been categorized in the following table. Several requirements identified in 21 CFR Part 11 require the system owner to comply by having appropriate Standard Operating Procedures (SOPs) in place. Not all of the required SOPs are included with Compact HMI 800 product offering, however ABB engineering services for validation can provide assistance in creating the appropriate documentation on a project basis. The primary sections from Part 11 are listed below.

Subpart B – Electronic Records

Sec 11.10 – Controls for closed systems

Sec 11.30 – Controls for open systems

Sec 11.50 – Signature manifestations

Sec 11.70 – Signature/record linking

Subpart C – Electronic Signatures

Sec 11.100 – General requirements

Sec 11.200 – Electronic signature components and controls

Sec 11.300 – Controls for identification codes/passwords

Table 4. Feature Categories

Feature Category	Section references from 21 CFR Part 11 Regulation
Authorization	SubPart B, Sec 11.10: (g)
Access Control	SubPart B, Sec 11.10: (d)
Electronic Signature	SubPart B, Sec 11.50: (a) Subpart B, Sec 11.70 Subpart C, Sec 11.100: (a) Subpart C, Sec 11.200: (a),(1), (i), (ii), (3) Subpart C, Sec 11.300: (a), (b), (d)

Table 4. Feature Categories (Continued)

Audit Trail	SubPart B, Sec 11.10: (a), (e) SubPart B, Sec 11.50: (a), (b)
System Checks	SubPart B, Sec 11.10: (f), (h)

Authorization - User Re-authentication and Double Authentication[1]

Re-authentication can be optionally used for critical operations such as writes to the control system, batch operations, and configuration changes in order to ensure that only authorized persons can take actions in the Compact HMI 800. This option forces the user to re-supply his/her user credentials before the operation is executed. A double authentication may also be optionally used. In this case an additional person who has the respective secondary authentication authority has to give username and password in order to approve the operation.

Access Control

Access to the Compact HMI 800 is controlled by the core system's security function. See Security on page 30.

Electronic Signature - Digital Signature

Electronic signatures are supported as a Digital signature for all aspects of objects. A digital signature is generated and linked to an aspect. User verification via electronic method is performed by using Windows user id and password in combination with a selected reason for signature and an optional comment.

Audit Trail

The Security and Access Control System allows audit of operator actions and security. The system supports logging of security violations, configuration changes, and operator actions to the process.

The audit logs can be viewed in the alarm and event list. This makes it possible to see the effect of an operation. The audit log contains the following information:

1. User re-authentication and double authentication are together with user log-over called Advanced Access Control in price lists, etc. See User log-over on page 31

- date and time for the operation
- node from which the operation was performed
- user name of the individual performing the operation
- type of operation
- object, property or aspect affected by the operation
- additional information from the involved aspect system.

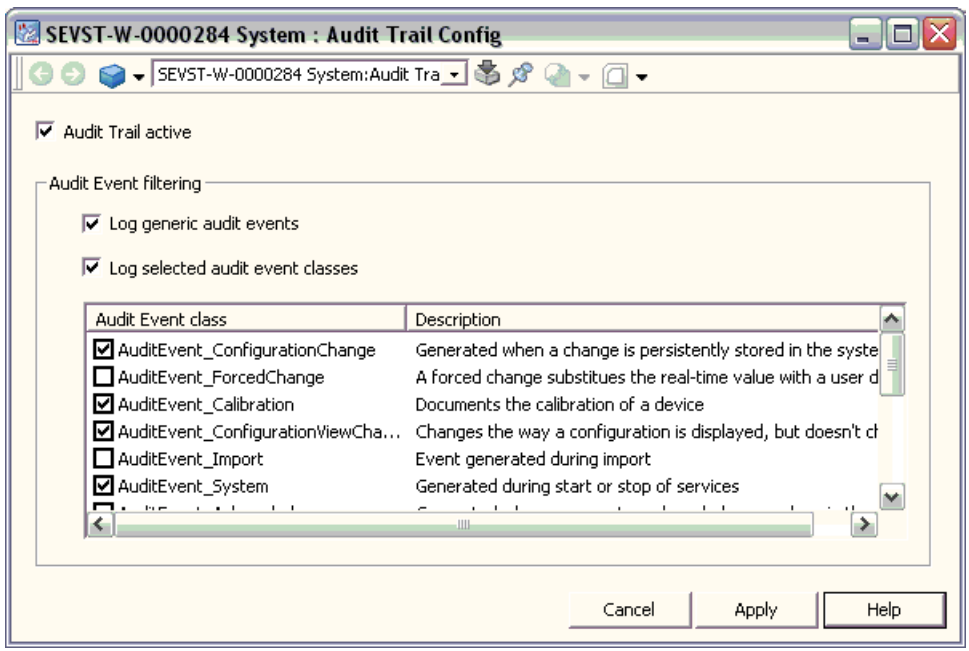
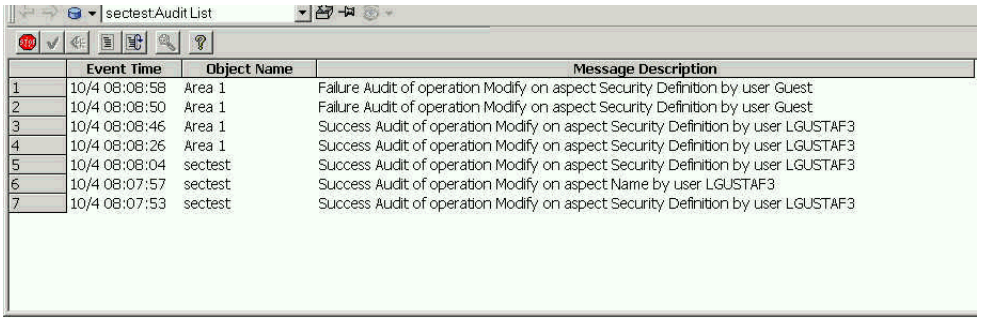


Figure 6. Audit Trail Configuration

The audit log is protected against modifications if the Aspect Servers via Windows login are configured with access restrictions.

As a complement to the audit logging available in the Windows system, the security and access control system in the Compact HMI 800 allows audit of more process control-specific activities.

The audit event list is user configurable to either show more information, or to filter out specific events from the complete event list.



	Event Time	Object Name	Message Description
1	10/4 08:08:58	Area 1	Failure Audit of operation Modify on aspect Security Definition by user Guest
2	10/4 08:08:50	Area 1	Failure Audit of operation Modify on aspect Security Definition by user Guest
3	10/4 08:08:46	Area 1	Success Audit of operation Modify on aspect Security Definition by user LGUSTAF3
4	10/4 08:08:26	Area 1	Success Audit of operation Modify on aspect Security Definition by user LGUSTAF3
5	10/4 08:08:04	sectest	Success Audit of operation Modify on aspect Security Definition by user LGUSTAF3
6	10/4 08:07:57	sectest	Success Audit of operation Modify on aspect Name by user LGUSTAF3
7	10/4 08:07:53	sectest	Success Audit of operation Modify on aspect Security Definition by user LGUSTAF3

Figure 7. An Example of an Audit List

The audit list is stored on disc. The size of the storage is configurable.

SMS and e-mail Messaging

SMS and e-mail Messaging provides a method for sending messages based on alarm and event information to user devices such as mobile telephones, e-mail accounts, and pagers. It is possible to control sending messages by configuring a message schedule for each user. The message schedule allows one active paging time interval for each day of the week.

Figure 8 shows and Table 5 lists the three methods SMS and e-mail Messaging employs to notify users of alarm and event information. The table also lists the devices that are compatible with each notification method, and which devices, using the SMS/GSM notification method, allow the user to confirm receipt of the message back to the Compact HMI 800.

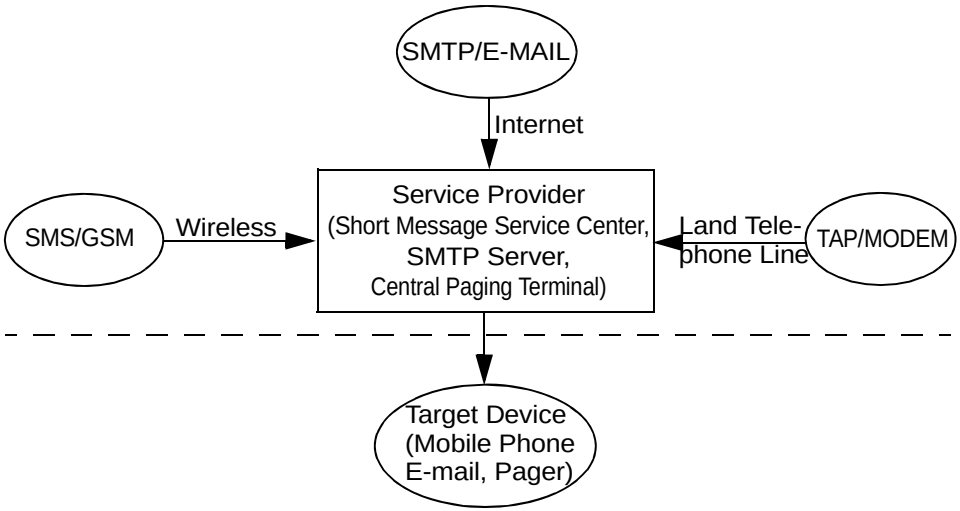


Figure 8. SMS and e-mail Messaging Notification Methods

Table 5. Notification Methods

Device(1)	Notification Method		
	SMTP/ E-mail	TAP/ Modem	SMS/GSM
Numeric Pager	—	—	—
Alphanumeric Pager	Notify	Notify	Notify
2-Way Pager - Fixed Reply	Notify	Notify	Notify
2-Way Pager - User Entered Reply	Notify	Notify	Notify/Confirm Receipt
2-Way GSM Pager	Notify	Notify	Notify/Confirm Receipt
Text Messaging Enabled Telephone	Notify	Notify	Notify/Confirm Receipt
Wireless Equipped PDA	Notify	Notify	Notify/Confirm Receipt
E-mail	Notify		Notify/Confirm Receipt

(1) This table lists the capabilities of SMS and e-mail Messaging. The selected hardware and/or service provider may impose other limiting factors.

The notification methods work as follows:

- SMS (Short Message Service)/GSM (Global System for Mobile Communication) - is used to send messages based on alarm and event information to the GSM service provider's SMS Center (SMSC) over a wireless network. The SMSC sends the message to compatible devices of users configured to receive them. This method allows users of the compatible devices to confirm receipt of the message.
- SMTP (Simple Mail Transfer Protocol)/E-mail - is used to send messages based on alarm and event information to an SMTP server over the Internet. The SMTP server sends the message to e-mail accounts, or to compatible devices via e-mail accounts, of users configured to receive them.
- TAP (Telocator Alphanumeric Protocol)/Modem - is used to send messages based on alarm and event information to the pager service provider's CPT (Central Paging Terminal) over a land telephone line. The CPT sends the message to compatible devices of users configured to receive them.

Calculation Engine

Calculations can be performed on any object or value in the system and are supported by Windows 2000 Visual Basic scripting language. The calculation services application is an Aspect System and is included as an option to the base. The Calculations Services provide the ability to run mathematical calculations on any available Compact HMI 800 aspect property or attribute. This includes a special set of aspect objects called Softpoints, see SoftPoint Server on page 41. Calculations may also be applied to system object types. This allows configuration re-use of calculations. Calculation operations can be triggered by changes to system point values, or can be scheduled to execute either cyclically or at a given date and time. A calculation aspect may be applied to any Aspect Object such as a unit, vessel, pump, or softpoint. Inputs can be any Aspect Object property, and outputs can be any changeable point in the system. Data quality and alarm generation are supported. Calculation logic is written in VBScript.

SoftPoint Server

SoftPoint services allow you to create and configure user defined object types, and deploy them like any other object in the base system. A softpoint is different from other system points because it is not directly connected to hardware system I/O. Softpoints execute on an application or Connectivity Server. Once configured, the softpoints is managed and accessed just as any other point in the system. Softpoint values may be stored in system history and displayed for operations. Reporting functions (such as Excel) may access softpoints for presentation in reports. In addition, softpoints can be displayed on Desktop Trends. Softpoint alarms can be configured and are directly integrated with minimum/maximum, limits and a unit descriptor. Data types supported are: Boolean, integer (32 bit), single precision floating point (32 bit) and string. Also, double precision floating point (64 bit) is supported as an extended data type.

Report Services

Reporting capabilities include the ability to schedule reports to execute cyclically, at specified times (e.g. the last Friday of the month), at a single time, and on event. Support for tools such as Excel is provided. In addition to reports, the integrated scheduler can be used to schedule other system operations.

Report scheduling capabilities include:

- Cyclic, event, and time based scheduling.
- Handling of finished reports, including e-mail, saving to file (and managing a number of instances of that report), saving to history, and printing.
- Display to view status of reports scheduled.

Section 4 Operations

Overview

The Operator Workplace function is built on the 800xA technology and is the Compact HMI 800 operator interface.

The key functions provided are: presentation of process graphics, execution of process faceplates, presentation of trends, and alarms.

Two types of Operator Workplaces exist:

- Operator Workplace - Server, including one client.
- Operator Workplace - Client.

Operator Workplace Client

The Operator Workplace provides efficient control and supervision of different kinds of processes in integrated systems.

The Operator Workplace uses client/server capabilities allowing both client and server applications to run in one PC for a small configuration, or to run in a configuration with one server and up to thirty client workplaces.

Functional overview:

- Graphic displays, with support for ActiveX components to include any third party graphical component.
- Faceplates for process objects.
- Alarm and Event management and presentation.
- Trend data, including short trend presentation.
- Reports - Excel based reporting (scheduled and on demand).

- System Status Viewer.

The Operator Workplace provides a number of configurable options that allow a user to tailor the workplace to suit their needs, be they a senior or junior operator, an engineer, a maintenance technician, a manager supervisor or a system administrator.

Layout options

The workplace is subdivided into 3 main areas (see Figure 9):

- An application bar area.
- A graphic display area.
- A status area. (Not configured as default).

The application bar area, located at the top of the screen, is divided into two parts – a fixed display part and a tools collection part. Both parts are fully configurable. Examples of information in the fixed display part are Alarm Group Bar, Alarm List, Clock, company logo (“any bitmap”), and User Login Name

Examples of information in the tools collection part are short cuts to alarm and event lists, shortcuts to display graphics, Help, Silence external alarm, user favorites.

The graphic display area, located between the application bar and status areas, is available to display any aspect. The aspects available for selection are determined by the user role and user security defined for the user currently logged in to the PC. Depending on the aspect view class setting, the aspect can be displayed to fully consume the area or it can be displayed as an overlap in front of the graphic display area. User roles can be configured such that one class of user cannot move an overlap in front of the application bar or status area (e.g., an operator) while another user can (e.g., an engineer).

The status area, located at the bottom of the screen, is configurable and may include the following information, User Login Name, Operator Message Line, Operator Link Message Line, Alarm List, Event List, Clock.

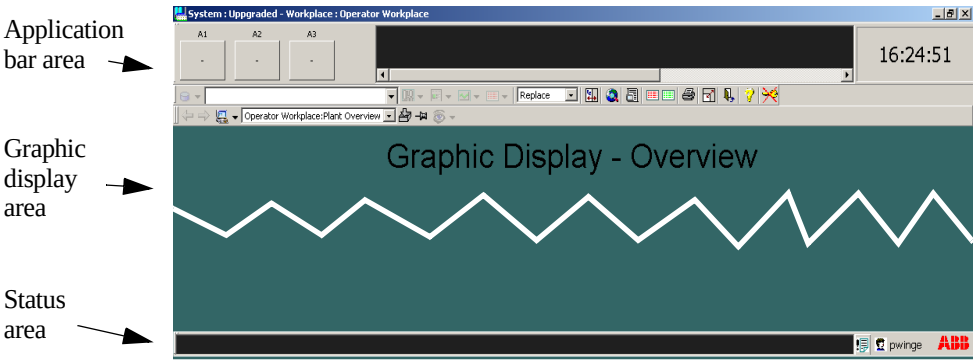


Figure 9. Operator Workplace layout

The figure above presents a workplace on one monitor. For information about the Multiple Monitor concept please read the section Alarm List on page 49

Faceplates

Faceplates are designed mainly for operator use, to monitor and affect control of a process. Each object can have up to three different sized faceplates, depending on the needs of the object and the user (see Figure 10.)

The Operator Workplace provides a flexible faceplate framework, making the creation and the customization of the product-supplied faceplates straightforward and intuitive. The faceplate framework is composed of five main areas.

At the top of the faceplate is the header area. This includes the object name and description, as well as alarm state indication, acknowledgement button, and object in-use (or locked) indication.

Below the header area is the status area. This includes object state indication (e.g., manual mode) and link buttons to other aspects (e.g., operator note).

At the bottom of the faceplate are the faceplate size selection buttons (for reduced, normal, and expanded size faceplates). Above the faceplate size selection buttons is the control button area. The configuration of the status and button areas is done through simple fill-in-the blanks configuration and provides the ability to link in button and status indicators.

Between the status and button area is a faceplate element area. This is a free-form graphic that is configured in the same way as any process graphic.

By pressing F1 when a face plate is selected, on-line help is invoked for that faceplate.

When there is a faceplate on the screen and another is selected, the normal behavior is to replace the first faceplate. There is however possible to configure the Operator Workplace to be able to show several faceplates at the same time. This may be done resulting in two different behaviors.

- All faceplates that are brought up are displayed separately. Each faceplate needs to be removed separately. The maximum number of simultaneous faceplates is configurable and the default number is five.
- Faceplates contains a pin-button in the lower right corner. If the button is pressed that faceplate is pinned and remains on the screen. If the faceplate is not pinned, it is replaced by the next faceplate that is brought up.

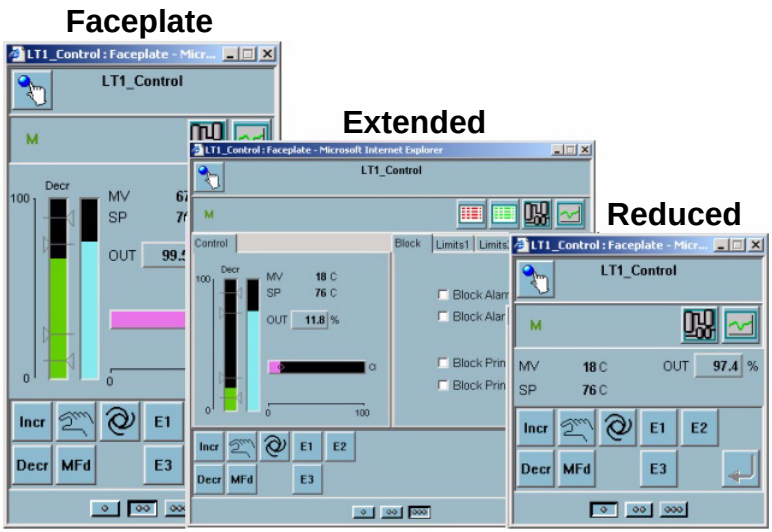


Figure 10. Faceplates

Display Call-up

The Operator Workplace supports the ability to provide different aspect view behaviors depending on the type of aspect view being displayed. The following aspect view behaviors are available:

- Initial call-up at cursor.
- Initial call-up at an offset relative the cursor.
- Initial call-up at a pre-defined X-Y coordinate.
- Stacking Order to determine which displays are in front of other displays.
- Height and Width of a Screen on initial call-up.
- Whether the screen is fixed in size or can be re-sized.
- Whether the screen can be pinned to prevent a user from closing it accidentally.
- Dedicated screen areas for alarm management functions, such as event/alarm bars.

- Dedicated screen areas for menus and tool bars.
- Pre-assigned direct access to user, object, and system related actions.
- Number of views/windows per workspace.

Users can also control the screen behavior to preserve a display, such that a new display call-up overlaps the existing one (thereby preserving the existing display), or to replace a display, such that a new display call-up replaces the existing one.

Navigation

The Operator Workplace supports the ability to right click on any object to view and select available actions or display call-ups from a context menu. For a given user, the context menu is the same, no matter where the object is displayed.
The configuration of an object automatically defines the possible selections available in the context menu. The context menu is possible to filter based upon the user log-in, such that an engineer might have access to certain actions that are configuration-related, while an operator would not have access to them. The context menu also contains a reference list of other graphics or displays in which the same object is used, allowing the user to quickly navigate to them. This reference list is provided automatically without requiring the user to do any manual mapping.

Within the tool collection of the application bar, a number of navigational buttons and pull down menus are available to provide quick access to displays and information. Object and aspect history lists as well as back and forward buttons allow an operator to view and recall past selections quickly. Associated displays of a selected object or aspect can be quickly called up using short cut buttons that are automatically enabled when the object or aspect is selected.

The Operator Workplace also supports the ability to access any display from any other display through one, or at most, two mouse clicks. To manage this, the user can define the displays to which quick access is needed in the same way that favorites are added when using Internet Explorer. The user can add displays to folders as favorites. The user can also add folders to help classify the displays by function, by area, or by the plant structures. The favorites are user specific and follow the user wherever he or she logs in.

Hot Keys

The Operator Workplace provides the ability to map key strokes (e.g. F4 key) or key stroke combinations (e.g. Alt-F4) to perform an action available to a selected object such as Alarm Acknowledge or Call-up a Process Graphic. The mapping of the keystrokes is user-configurable. The Operator Workplace will include default mappings for key actions such as Alarm Acknowledgement.

Hot Key support makes it possible for customers to use prepared configuration menus and in an easy way set up global operations (independent of workplace, display, or selected object) and object sensitive operations.

Alarm List

The Alarm List displays all events matching the configured alarm filter. All, or a subset of an event's attributes, along with the current value for that objects can be displayed. Viewing the alarms is very flexible. Use the default sort order or adjust the sorting by double clicking on the headers. Adjust the layout by drag & drop columns to suit your needs. Return to the default layout by just clicking on the reset button.

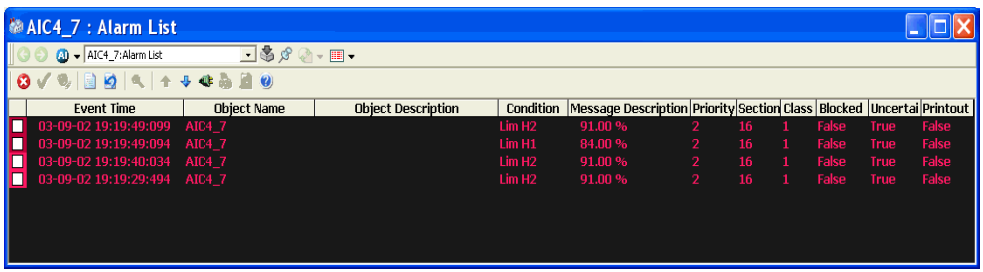


Figure 11. Alarm List

Acknowledge of individual alarms, selected multiple alarms, or an entire page of alarms can be performed from the Alarm List.

The colors and blinking of alarms are configurable. It is also possible to define what columns to present, the time format, and the sorting order of the list.

If an alarm is irrelevant it should not be shown in an alarm list. An alarm is irrelevant if it does not require an action from the operator. A function called hiding will help the operator to clear the alarm lists from irrelevant alarms.

Event List

The Event List displays all events matching the configured event filter. The event list functionality is the same as for the alarm list, except for the acknowledge feature.

Trend Display

Trend displays are some of the most important tools associated with operating and analyzing industrial processes. The Operator Workplace addresses this need by presenting the operator with an extensive set of trending features and functions.

The Trend display can present data seamlessly from both run-time and historical data. When a trend display for an object is selected all available data is shown. This also means that the user can move the time range back and forth without worrying about where data is coming from. The user can also use the time-offset function to trace a signal in real time and compare it with values from yesterday.

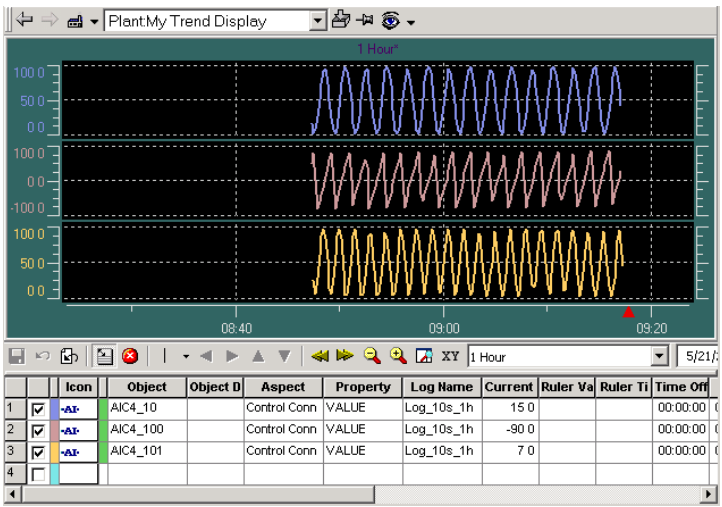


Figure 12. Trend Display

The Trend Display can hold a number of trend traces and the user can trend any attribute. Thus it is possible to trend both the value and the alarm limits for several objects in the same Trend Display. With one click the user can hide or show traces and browse for new objects.

It is also possible to present trend relationship between two values as X/Y plots. The plot may be presented on a background display for example a JPEG picture. Two such displays can be dynamically selected.

Functionality for rulers, time zooming, magnifying glass etc. are available.

Group Display

With the Group Display aspect it is possible to display a collection of aspect views in a table format. For example you may want to combine several faceplates in one display.

The Group display is handled the same way as other aspect views regarding navigation etc. See Figure 13

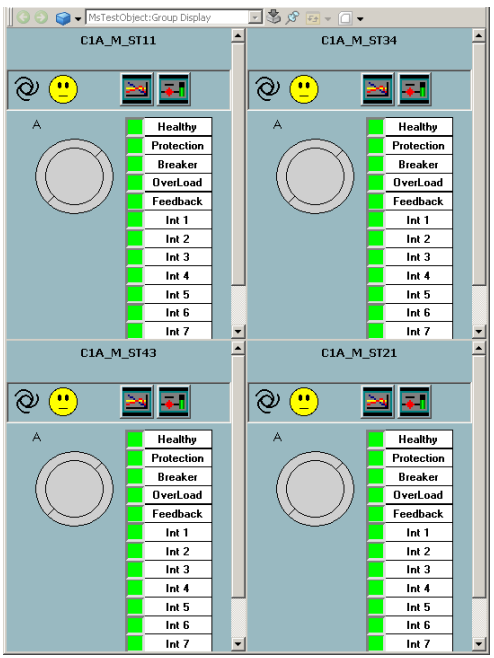


Figure 13. The Group Display Aspect - Main View

Log over

The Compact HMI 800 Security model is based on extensions to the Windows security model. The extensions make it possible to set permissions for users or user groups on an Compact HMI 800, a structure or part of a structure, or an Aspect Object.

For example the permission “Operator” gives the rights necessary for the tasks of an operator. As an administrator you have all permissions.

The log over function enables a fast and temporary switch between users in a running workplace. For example if an operation requires a permission not held by an operator, another user (e.g. an administrator) that holds the required permission, can log on to perform that operation. The log over changes the permissions and user roles but keeps all open windows with their present contents. The permitted actions in the open windows are controlled by the permissions of the logged over user.

Section 5 Engineering

Overview

The major goal for the Compact HMI 800 Engineering suite is to provide maximum engineering performance. To reach this goal, a suite of tools are offered. All tools are integrated and support the Aspect Objects architecture. The tools scale from simple standards-based control configuration tools to software development kits, which enable the use of custom tools to gain performance.

The tools can be applied throughout the plant lifecycle from the design phase into the operation phase maximizing the performance in design and maintenance.

Standard Engineering Tools are to be used by application engineers and maintenance engineers implementing and servicing the control configuration.

Engineering Workplace

The set of Standard Engineering Tool is called Engineering Workplace. It consists of the following features:

- Engineering Platform including Bulk Data Manager.
- Graphics Builder.

The Engineering Workplace functionality is available on the Server Workplace.

Engineering Platform including Bulk Data Manager

The Engineering Platform offers the following functionality.

- Use of a powerful designation handling with self adapting designations

- Create and maintain your documentation by the integrated *Document Manager*. The data reference function of Document Manager enables actual data from other applications or actual values of central parameters in all Word, Excel, and AutoCAD documents. Different versions of documents can be stored. Document packages can be created.
- Efficiently manage, view, report and store common plant parameters with the integrated *Parameter Manager*

Bulk Data Manager

The ability to efficiently manage large amounts of data is a crucial part of any automation system. The Compact HMI 800 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 Compact HMI 800.

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.

Graphics Builder

Graphics Builder is a tool, which enables configuration of graphic aspects, e.g. graphic displays, graphic elements and faceplate elements. It is a tool built on Visual Basic. Graphics Builder provides several features for configuring graphic aspects, and writing expressions. Even though the Visual Basic environment is a full-fledged programming environment, the configuration of graphic displays of graphic elements does not require programmers to have a Visual Basic background. Graphics Builder allows the full power of Visual Basic if needed. For example the Visual Basic code panes are available and the environment is accessible.

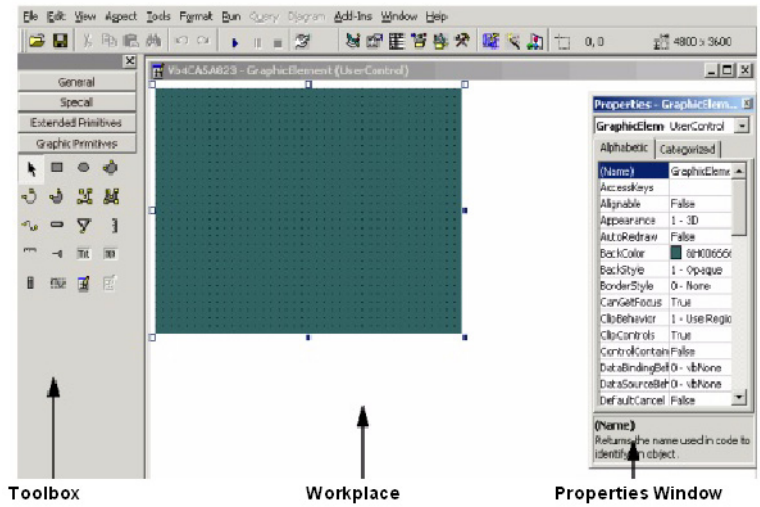


Figure 14. Graphics Builder

The following features are specific to the Graphics Builder.

- Expression Builder that allows you to assign expressions (that is, to specify subscriptions and specify the relationship between the process data and the data that is to be displayed).
- Graphic Libraries dialog which allows you to add Primitives and Sub-elements to your toolbox.
- Element Browser in which you can select to include appropriate graphic elements.
- Design and Test function that enables you to build graphic aspects in design mode and then check their behavior in test mode. Included is also a test data provider.

- Deploy function which stores the graphic aspects and enables viewing of process displays by process operators. Before a graphic element is deployed, it can only be seen in Graphics Builder.
- Help function that offers you access to On-line Help.
- Graphics wizard that guides you through the steps of building graphic aspects.
- Add Member function that allows you to add properties, methods, and events to a graphic element.

Property elements enable input directly from a graphic to an OPC property.

Section 6 Communication Network

This section describes the Compact HMI 800 network architecture. Different network security measures that should be considered when an Compact HMI 800 is connected to external networks of different kinds are also presented.

The Industrial IT Network Architecture

Overview

The Compact HMI 800 network architecture is illustrated conceptually in Figure 15:

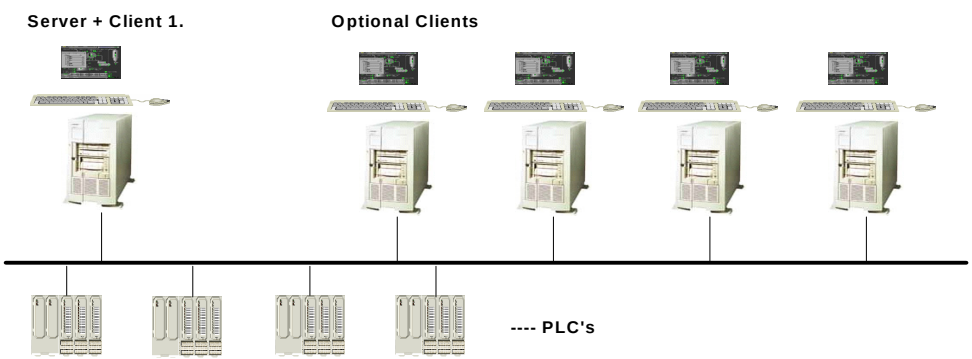


Figure 15. Conceptual communication network configuration

The *Compact HMI 800 network* is used for communication between *workplaces*, *servers* and *PLCs*. It is a local area network (LAN) that is optimized for high performance and reliable real-time communication with predictable response. Servers run software that provides system functions.

Workplaces run software that provides various forms of user interaction. Controllers are nodes that run control software.

The automation system network can be connected to a *plant network*, such as an office or a corporate network, via some form of network isolation device. The nature of this device depends on the nature of the plant network and the level of security that is required for the automation system – it may actually be a set of interconnected computers and devices that cooperate to provide the level of security required in a particular installation. Compact HMI 800 is pre-loaded using a workgroup configuration. Connection to a plant network requires a reconfiguration.

A redundant network is continuously being monitored by the RNRP protocol. All network events, including configuration errors, are reported to the user.

Further connection of the plant network to the Internet or any other type of external network should be performed in accordance with adequate network security practices.

Third party PLCs using other communication standards and protocols may also be connected. The Compact HMI 800 has been tested with a set of protocols

Note that for performance and integrity reasons, direct connection to an automation system network or systems not based on Industrial IT should be avoided.

The automation system network is based on TCP/IP over Ethernet. The routing protocol that is used is RNRP (Redundant Network Routing Protocol). This protocol supports redundant network configurations based on standard network components.

Detection of a network failure and switch over to the redundant network takes less than one second, with no loss or duplication of data. A redundant network consists of two fully separate Ethernets. It works as a standard TCP/IP network, with the addition of RNRP, which works as described in the section below.

Redundant Network Routing Protocol (RNRP)

RNRP is an IPv4 routing protocol developed by ABB. It is specially designed for use in automation networks with limited topology but with high demands on network availability. The protocol has alternative paths between nodes to enable quick reaction on network failures. In Compact HMI 800 only one network is used.

RNRP handles the node and network supervision. RNRP quickly detects if a node or remote network is down. This information is used to detect if a redundant server is down and whether a new server can be connected.

Each node cyclically sends a routing vector as a multicast message. The routing vector indicates which other nodes this node can see on the network. Each node uses received routing vectors to build a table listing which nodes can be reached on which of the two networks. Routing vectors are distributed with a cycle of 1 second.

The automation system network is a private IP network. IP addresses are static, and must be selected according to a scheme defined by RNRP. Each node has two IP addresses, one on the primary network, and one on the backup network, see IP Address Use on page 66.

Advantages with the RNRP redundancy concept are that it works with standard network devices (hubs, switches or bridges), and that no special Network Interface Cards (NICs) are required.

Industrial IT Network Security Considerations

For more information see the document 3BSE032547, Industrial IT Integrated Automation System - Network Security Consideration in ABB Library.

Security

The security information in this document are provided to you for background information only. Consult your IT Network professional in order to determine your specific implementation. It is the responsibility of the end-customer to have an updated and implemented IT security policy in his process automation.

Firewall

There should always be a correctly configured dedicated firewall as the only interconnection-mechanism between the Internet and the ABB process control installation.

A firewall is a system which main purpose is to control the access to or from a protected network (for example a control network). A correctly configured and maintained firewall ensures that all communications attempting to cross from one network to the other meet an organization's security policy.

Firewalls track and control communications, deciding whether to allow, reject or encrypt communications. In addition to protecting trusted networks from the Internet, firewalls are increasingly being deployed to protect sensitive portions of local area networks and individual PCs.
The design of a firewall system should be based on the user’s corporate security policy, therefore it's very important to discuss and investigate this carefully.
It should be revised on a regular basis because of the increasing number of resources and applications which are available on the Internet and local networks.
A firewall system can be a router, PC, dedicated hardware solution, workstation, one or more servers, or a mix of these, configured to protect a site or subnet from protocols and services that can be abused by hosts outside the subnet. A firewall system is usually located at a higher-level gateway, such as a site's connection to the Internet. However, firewall systems can be located at lower-level gateways to provide protection for smaller collections of servers or subnets.

As of the writing of this document the following types of firewalls exist:

- packet-filtering firewall.
- a circuit level gateway.
- an application level gateway.
- a stateful inspection firewall.

ABB suggests consulting the user’s corporate IT department or consultant to determine which firewall is most appropriate for the user’s installation.

Some popular firewall systems available today include:

- Checkpoint Firewall-1 (http://www.checkpoint.com/).
- Cisco PIX (http://www.cisco.com/).
- Netscreen (http://www.netscreen.com/).
- Nokia Firewall (http://www.nokia.com/securitysolutions/).

When accessing the process control system from the internet, a VPN (Virtual Private Network) must be set up through the firewall. The internet-based computer must be clean, under strict user access control, not used for other purposes and have no other connections to the Internet other than the one used for the VPN connection. The VPN should end in a VPN concentrator placed in the DMZ (Demilitarized Zone) of the firewall.

Virus Risks

It is very important that the systems are protected from viruses, trojans and other malicious software.

Do not allow running of non-authorized software on the clients or servers used for process control, or on other PCs connected to any part of the network without a firewall between the network and these other elements.

Use an updated virus scanner to regularly scan the systems for viruses. McAfee VirusScan and NetShield are possible examples. (http://www.mcafee.com/, http://www.nai.com/).

Run all external traffic through the firewall. Set up a virus-scanner for all traffic through the firewall.

Allow only authorized users to log on to the systems. Do not allow guests.

Do not allow users to run the system with an authority level that is different from that for which they have been approved.

Domains

Windows Workgroup

A Windows Workgroup is not managed on a dedicated PC. The workgroup configuration needs to be done on all PCs that belong to the workgroup. This includes handling the names and addresses of the PCs and definition of users and groups. The users and groups need to be created exactly the same way on all PCs in the workgroup and the host names are handled with a host-file that must be the same in all PCs.

There is no fixed limit for the number of nodes or number of users that can be handled within a workgroup, but systems with more than 10 PCs or 5 users are normally easier to manage in a domain.

System Servers

Any service (piece of software) can, from an architectural perspective, run on almost any server (logical piece of software) in any server node (physical PC server) in the system. To create simple configuration rules, avoid unsuitable configuration combinations, and to describe, test and verify various supported configurations, definitions for three classes of servers follow. Even though it is in some cases possible to optimize an installation by using other configurations, it is recommended the guidelines given in this section be followed.

- ***The Aspect server*** runs the “central” intelligence in the system, including the aspect directory and other services related to object management, names, security, etc. Examples of services that run on Aspect Servers are the Aspect Directory, Structure and Name Server (SNS), Cross Referencing (XRef), and File Set Distribution (FSD).
- ***The PLC Connect server*** provides access to controllers and other data sources. Several groups of connectivity servers may exist in a system, each serving one set of data sources. Examples of services that run on a connectivity server are OPC related services (DA, AE, and HDA).

Compact HMI 800 runs using Workgroups.

Server classes are deployed on *nodes*. A node is a network addressable machine (a PC). For very small installations, one single node (PC) can carry all these server categories as well as the client part(s) of the product(s).

Communication Hardware

Switches and Routers

A **Hub** is a connection device within a network segment. It is an Ethernet multiport repeater. A hub only allows one message to be transferred at a time between all of its ports. This means that there will be message collisions when more than one node transmits at the same time, just as it used to be with the old coax cables. Collisions are handled by the media access mechanisms of Ethernet, but in a network with heavy traffic the collisions decrease the data throughput and give non-deterministic response times in the network.

A **Switch** is a more sophisticated type of hub.

It filters and forwards frames based on the destination address of each frame.

A switch eliminates most of the message collisions caused by several nodes transmitting at the same time. This is basically accomplished by queueing messages per port and by allowing several point-to-point messages to be transferred simultaneously, if they go between different pairs of ports. This means that a network using switches will allow a much higher throughput than a network using hubs and it does not have the same problem with non-deterministic response times.

Switches that only store and forward ethernet packets without being accessible as nodes on the network are called **un-managed switches**.

Switches that act as a node with an IP address on the network giving access to network management information are called **managed switches**. The network management information is for example configuration data for the different ports regarding port speed and status information about number of bytes transferred, check sum errors etc. The amount of management information may differ very much between different switch types.

The actual ethernet packet switching function is often the same for managed and un-managed switches. These are some pros and cons for managed and un-managed switches:

- Un-managed switches are typically cheaper.
- Managed switches give the possibility to supervise the network better.
- Managed switches may give possibilities to control the traffic better by e.g. address based traffic filtering.
- In a small network the additional features of a managed switch may be unnecessary.
- In a large network the additional features of a managed switch may be very useful.

For the Compact HMI 800 we recommend the use of un-managed switches or hubs.

Network Cables

In industrial environments optical Ethernet cables are preferred.

Switches having both optical and electrical interfaces can be used between the two media types.

Within a cabinet, or within a control room where there are no unsuppressed loads or other disturbances, shielded, twisted pair cables (cat5 or cat6) can also be used.

Network Performance

The number of nodes in one control network is limited to five, due to limited routing resources in the controllers, and to the load generated from RNRP in the controllers. RNRP provides a redundancy changeover time of ca 1 s.

For larger installations, the controllers should be placed on separate Control Network areas with the connectivity servers as routers.

It is recommended to use 100 Mbit/s switched fast Ethernet communication between clients and servers. Controllers use 10Mbit/s, and should be connected via switches to 100 Mbit/s backbones.

IP Address Use

The nodes (clients, servers and controllers) in the control network should use the IP v4 private address range 172.16.x.x, or 172.20.x.x, or 172.24.x.x, or 172.28.x.x, as RNRP requires dual sequential address ranges. The sub-net mask should be 255.255.252.0.

If connection and routing to a plant network is required using an other IP address range, a router should be used in between.

Section 7 System Management

Product Installation

The Compact HMI 800 software is delivered pre-installed on a PC and with a license according to the order. The license is required to unlock features for operating or engineering the system.

Updates and security related software from non-ABB companies must be downloaded and installed separately, as guided from the Automated Installation program.

PC Hardware

The Compact HMI 800 is verified in a limited number of configurations, PC types, and brands. Only one PC type is available today. The tested machine is specified for reference, a minimum configuration, and recommended requirements on the PC. Windows compliance (processor speed, RAM size, free space on hard drive, free PCI slots, service packs, versions, etc.) are specified in product data.

Third Party Software

The Compact HMI 800 and its features require that a number of third party software products are installed. The requirements are indicated per Core Functional Area or by node type, but are also summarized in the document 800xA Third Party Software 3BSE039230, that can be found in ABB Library.

Diagnostics Collection Tool

The ABB Diagnostics Collection Tool is part of the Compact HMI 800 and is used to collect diagnostics information, for support and trouble shooting purposes, from any node (or nodes) in the system, local and/or remote.

The ABB Diagnostics Collection Tool is part of the Compact HMI 800 and is installed on all computer nodes in the system. Communication between nodes is via DCOM. The data collected, typically for later analysis, is packaged into compressed cabinet (.cab) files which are combined with a short description (entered by the user) of the reason for collecting the data, the surrounding circumstances, and other relevant information.

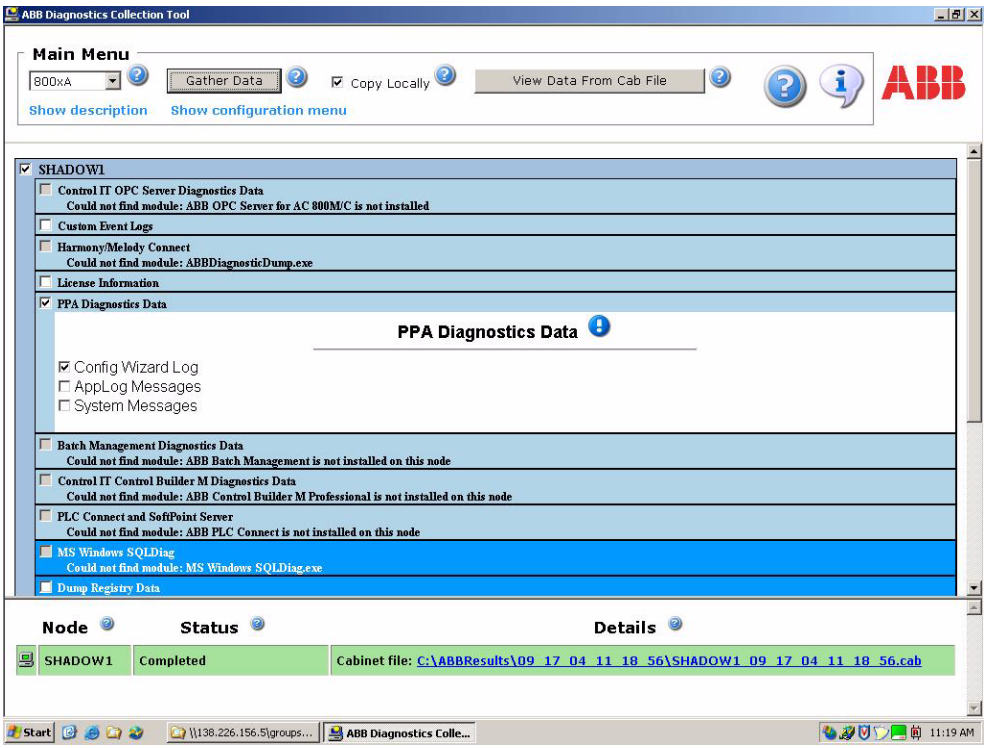


Figure 16. The ABB Diagnostics Collection Tool

The overall purpose of the tool is to unify, and make consistent, the information gathering process for all ABB Industrial IT products regarding necessary information from installations at customer sites. This will help speed up the problem resolution process.

The main functions of the tool are:

- Gather diagnostics data from nodes in a distributed system.
- View the gathered data to facilitate analysis.

Supported Products

The ABB Diagnostics Collection Tool for Compact HMI 800 product supports:

- Core System and Operation
- Central Licensing
- PLC Connect
- Softpoint Server

The Diagnostics Collection Tool runs on the following operating system:

- Windows XP

Industrial IT Related Functions

Core System and Operation Diagnostics Data

This plug-in collects log files generated by the Core System and Operation. It collects data generated by Applog and System events.

- AfwConfigWizard.log

  Lists all loaded files upon creation and startup of a system.

- System Messages

  A system message is intended for a user of the system.

- Applog

  Application log (Applog) is the primary debug and diagnostics tool of Compact HMI 800. The tool supports logging and state ´report´ operations.

Control OPC Server Diagnostics Data

This plug-in collects log files generated by the Control OPC Server.

- Session Log Files

  The OPC Server for AC 800M automatically creates a Session log file on the hard disk at start-up. This file contains information generated during one session, i.e. from the time the product is started until it is stopped. A new file will be created upon each new start-up.

  At start-up, information about the hardware and software versions, and later, information on system events, such as mode changes and error printouts, are logged in the Session log. The log is continuously updated in a running system, and whenever a problem occurs it is a good idea to look at the log to see if there are any printouts.

- Heap Statistics Log

  Every time a message “memory full” occurs in OPC Server, the system software will automatically generate a Heap Statistics log file containing information about the content of the heap.

Compact Control Builder Diagnostics Data

The following log files are available:

- System Log File

  The System log is created the first time Compact Control Builder is started and is used to store general information concerning Compact Control Builder. Examples of information logged are starting/stopping of Compact Control Builder, users logging on and out, changes in system privileges and changes in the setup of Compact Control Builder made in the Tools menu.

- Session Log Files

  See Session Log Files description in Control OPC Server Diagnostics Data on page 70.

- Start Log

  Compact Control Builder creates a Start log file for logging the last offline to online transfer. Information, such as warnings and error messages, will be logged. The Start log is very useful when investigating errors that may occur during or just after an Offline -> Online transition. Sometimes the start log will give a natural explanation of what at first looks like an error (e.g., lost Cold Retain values).

- Heap Statistics Log

  Heap Statistics Log description in Control OPC Server Diagnostics Data on page 70.

- Controller System Logs

  The controller AC 800M has a circular log buffer (size 16 kb) that can hold a certain amount of information, normally all information that has been generated during the last 5-8 start-ups. The Controller System log is never deleted, provided that the battery backup, to retain the information during power failure is working properly. This function makes it possible to restart a faulty system immediately to regain control of the process, without loosing vital information about the error.

- System Information Report

  The System Information Report is a list of hardware, software and setup information for an engineering station. This information is generated by a menu command and presented in a text editor.

License Usage Overview in a Running Compact HMI 800

An overview of the available licenses and the usage of the licenses are given by the "License Usage" aspect. This overview is available by adding this aspect to e.g. the root object in the system. The aspect is shown in the Figure 17 below.

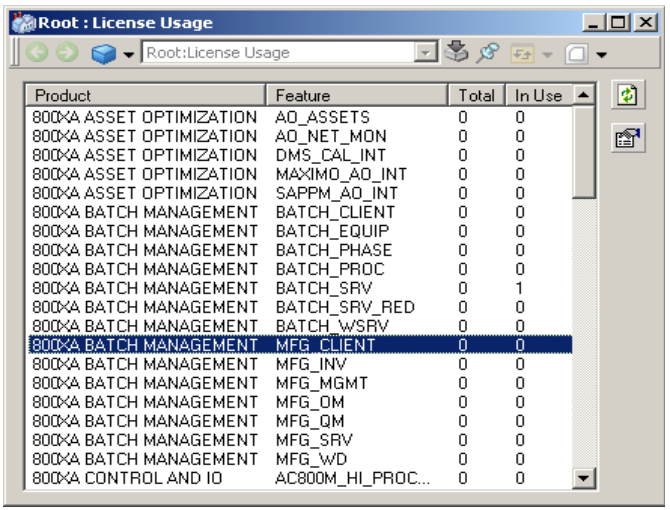


Figure 17. License Usage overview

The aspect shows both the delivered features (Total) and the actual usage (In Use) of the features.

Plug-ins

Central Licensing

This plug-in collects information related to Central Licensing, including available and used licenses.

Production Management

This plug-in collects system log files generated by Production Management.

PLC Connect & Softpoint Server

This plug-in collects system log files generated by PLC Connect and Softpoint Server.

Microsoft Related Functions

Installed Software Version Information

This plug-in lists the versions of all installed software, including Industrial IT Compact HMI 800 products.

Dump Registry Data

This plug-in dumps the registry data, either the complete registry or for ABB software only.

SQL Diag

SQLDiag gathers diagnostics and current state information within SQL server and stores it in a readable file.

This utility can be run anytime, whether or not SQL Server is started.

Dr. Watson

Dr. Watson is an error-handling application for Windows systems. It detects and diagnoses program errors, then logs the resulting diagnostic information. The drwtsn32.log and the user.dmp files maintain the diagnostic information.

MS Windows Task Manager

TaskMgr examines the system memory load and shows a synopsis of the processes and applications running on a system. It indicates the total physical memory, the free memory, and the amount used by the cache as well as the most commonly used performance measures for processes.

MS Windows Service Information

Service Information gathers information about a target server running Windows, such as server name, version, domain, drive information, services and state, and system up time. There are three options available: Show Service and Service Drivers, Get Version Info, and Show Shares.

MS Windows Process Information List

Process List shows information from all the processes that are currently running on a system. This information includes the time of execution, amount of time the process has executed in user and kernel modes, and the amount of physical memory the OS has assigned the process.

- Threads

  Shows statistics for all active threads on the system.

- Memory Detail

  Shows memory-oriented information for each process, rather than the default of CPU-oriented information.

- Processes, Memory, Threads

  Shows CPU, memory and thread information for each of the processes specified.

- Process ID

  Instead of listing all of the running processes in the system, this parameter narrows the scan to those processes that begin with the name of the process or match a specific process ID.

  Process ID numbers can be obtained from the PID column of the Task Manager.

MS Windows System Event Logs

System Event Log records system and hardware events as log entries on a server. Application, security, and system event logs may be viewed.

- Application Events log

  The application log contains events logged by applications or programs.

- Security Events log

  The security log can record security events such as valid and invalid logon attempts as well as events related to resource use such as creating, opening, or deleting files. An administrator can specify what events are recorded in the security log.

- System Events log

  The system log contains events logged by the Windows system components. For example, the failure of a driver or other system component to load during startup is recorded in the system log. The event types logged by system components are predetermined by Windows.

MS Windows User Dump

User Dump displays a list of all running processes and their process IDs recorded in a text file called User Dump.txt. User dump can capture the state of a process and can be very useful when troubleshooting servers that have stopped responding and unresponsive processes.

MS Windows Handle List

Handle List is a utility that displays information about open handles for any process in the system. You can use it to see the programs that have a file open, or to see the object types and names of all the handles of a program.

MS Windows DLL List

ListDLLs is able to show you the full path names of loaded modules - not just their base names. In addition, ListDLLs will flag loaded DLLs that have different version numbers than their corresponding on-disk files (which occurs when the file is updated after a program loads the DLL), and can tell you which DLLs were relocated because they are not loaded at their base address.

Section 8 Technical Data and Performance

Compact HMI 800 Capabilities

The Compact HMI 800 is scalable both in functionality and size. The rules for how the system can be configured depends on how functionality is combined in different node types, and on the system and application size. This chapter defines these combinations and rules for Compact HMI 800 SV 4.1.

Servers and Clients

Different system functions are provided by different types of nodes in a Compact HMI 800 installation. A node in this context is a computer (PC) that has a network address on the Compact HMI 800 network, used as a server, or as a client.

Basic Node Types

The basic node types are:

- **Aspect Server** - runs the ‘central’ intelligence in the system, including the aspect directory and other services related to object management, object names and structures, security etc.

The Aspect Server and PLC Connect connectivity server are delivered pre-installed in one node.

- **Client** - runs workplace functionality, such as operator and engineering workplaces.

Server Based Clients

All node types include client functionality. These clients are referred to as server based clients.

Compact HMI 800 Dimensioning

Signal and Tag Calculation

The server and clients are scaled based on signals and tags.

- A **Signal** is any aspect object of the type PLC xx Signal Type, where xx defines the type of signal. Each signal represents a value that is read or written from or to a controller, PLC or other external device connected to Compact HMI 800.
- A **Tag** is any Aspect Object that has one or more Faceplate Aspects attached.

Configuration Rules

Network Configuration

The maximum number of nodes (PC nodes and controllers) in one control network area is given in Table 6. The limitation is primarily due to the load generated from RNRP in the controllers in the control network. This will give a redundancy changeover time of ca 1 s.

For larger systems a split into separate Client/Server and Control networks is recommended, if needed with several control network areas (see The Industrial IT Network Architecture on page 59). The maximum number of (PC) nodes on a client/server network is stated in Table 6.

It is recommended to use 100 Mbit/s switched, fast Ethernet communication between clients and servers. Controllers use 10 Mbit/s, and should be connected via switches to 100 Mbit/s backbones.

History Logs

The history function in Compact HMI 800 is storing the data on the C-disk in the server workplace. The disc space and the number of logged items/second is limited. The following basic rules applies.

Max number of logged, time stamped values, stored per second are 500 in the server.

Max number of time stamped values stored are 600.000.000 in a server, this consumes 120GB Disk space.

Max number of logs continuously running (primary and secondary) in a server is 2000.

The following sample calculation shows how to calculate the maximum period for which the server can store historical data:

- LS (Logged Signals): Number of signals retrieved from the controllers and stored cyclically in the server.

- CT (Cycle Time): Time between each sample in seconds.

- LT (Logged Time): The length of the history log.

LT = 600.000.000 * CT / (LS*3600*24*365) Years

Example:

LS=500

CT= 10 min

=> LT = 600.000.000*10 / (500*60*24*365) = 22.8 Years

If we are logging 500 Signals every 10 minutes values can be stored for 22 Years.

Configuration Rules Summary

The following table details the limits in system and application size.

Table 6. System Configuration limits

Parameter (max numbers)	Compact HMI 800 with server based client
Signal/(Tags)	5000/(2000)
Client nodes	5 (including server based clients)
Engineering Clients	1 (server based)
PLC Connect connectivity server	One included in the Operator Workplace Server
History logs	250

Available Functions

The Compact HMI 800 offering is extensive and flexible. In the “System Capacity and Performance Data” section guidelines are given, such as PC requirements, capacity, limits, and technical configuration rules.

In addition to this information, some system guidelines have been stated, during verification and validation, to make the ordering easier, to avoid unsuitable combinations of options, etc.

Table 7: Available Functions with PLC Connect

Licensed Functions	Comments
Operator Workplace Server	Must always be selected
Operator Workplace (Client)	1 license required for each running client
Engineering Workplace - Rich Client	
50, 500, 2500 signals	Some must always be selected
PLC Connect Dial-Up	Can only be combined with AC 800M Connect
Audit Trail	
Advanced Access Control	
SMS and e-mail Messaging	
Calculation Engine	
Excel Based Reporting	Requires Operator Workplace.

System Capacity and Performance Data

PC Specification for the Compact HMI 800

The following tables gives an overview of the PC hardware characteristics for the Compact HMI 800 Operator Workplace Server and Client. The figures are based on performed tests and verifications.

Compact HMI Standard PC Hardware Server amd Client

Table 8. DELL Precision T3400

Parameter	Data
Common for Server and Client	
PC Model	DELL Precision T3400 525w
Chassis	Intel core 2 Duo Mini-Tower without Firewire
Processor	Intel Core2 Duo Processor E6550 (2.33MHz, 2MB Cache, 1066MHz FSB)
Floppy Drive	3.5" 1.44 MB Floppy Drive
DVD/CD-RW	48X CD-RW/DVD combo
Video	256 MB NVIDIA Quadro NVS 290, DVI Graphics, (Support for dual screens)
Monitor	Monitor not included - see options
Network Card	Additional Gigabit Ethernet PCI-E Network Card and additional Network Adapter-Broadcom PCIe (in total 2 network connections)
Accessories	2Seriel, 1Parallel, 6USB
Keyboard	US/Euro (QWERTY) - Dell Quietkey USB Black Keyboard, no palm rest
Mouse	Dell Black 2 Button USB Scroll Optical Mouse

Table 8. DELL Precision T3400

Parameter	Data
Operating System	Microsoft® Windows® XP Professional (SP2)
Sound Card	Standard Integrated
Base Service	3 years NBD onsite Technical Support (Direct Countries only)
Account Management	GCP Std Service
Additional for the Server	
Memory	2.0GB 880MHz NON-ECC DDRll Memory (2x1 GB)
Hard Drive 1	160GB SATA 3.0Gb/s with NCQ and 8MB DataBurst
Hard Drive 2	250GB SATA 3.0Gb/s with NCQ and 8MB DataBurst Cache
Office SW	Microsoft Office 2003 Professional
License Dongle	Compact HMI 800 only support Dongle based licensing
Additional for Client	
Memory	1.0 GB 800MHz NON-ECC DDRll Memory
Hard Drive	80 GB SATA, 7200 RPM Hard Drive with 8MB DataBurst Cache™
Service and Support	
For service see: http://www.dell.com/us/en/gen/services/service_service_contracts.htm	
For support see: http://www1.us.dell.com/content/topics/global.aspx/services/en/nbd?c=us&cs=555&l=en&s=biz#tn1	

Supported Operating System
Compact HMI 800 SV 4.1 is supported by the following operating system:

- Windows XP Professional for clients and server.

Compact HMI Industrial PC Hardware Server and Client

Table 9. Industrial Computer IPC-7220

Parameter	Data
Common for Server and Client	
PC Model	Industrial Computer IPC-7220
Chassis	IPC, rack mounting kit available
Processor	Industrial motherboard with Intel Core2Duo 2.13 GHz 800MHz FSB
Floppy Drive	3.5" 1.44 MB Floppy Drive
DVD/CD-RW	DVD-RW (CD X48, DVD x16)
Video	PCI-E 128 MB (Matrox QID-E128LPAF Quadruple), (Support for dual screens)
Monitor	Monitor not included - see options
Network Card	Dual LAN , 1 GB, RJ45
Accessories	4 serial and 1 parallell port in backpanel
Keyboard	KB US IP65
Mouse	MS mouse

Table 9. Industrial Computer IPC-7220

Parameter	Data
Environmental Specification	Temperature: 0 - 40 C^o (operating) -20 - 60 C^o (non-operating)
	Humidity: 10 - 85% @ 40C^o non-condensing (operating) 10 - 95% @ 40C^o non-condensing (non-operating)
	Vibration: 5 - 17 Hz 1,27 mm p-p (operating) 5 - 17 Hz 2,54 mm p-p (non-operating) 17 - 500 Hx 1G (operating) 17 - 500 Hz 2G (non-operating)
	Shock. 10G/with 11 ms duration, half sine vawe (operating) 20G/with 11 ms duration, half sine vawe (non-operating)
	Altitude: 0-3.048 m (10.000 feet)
	EMC: Fullfills EMC requirements; Emission Office, Immunity Industry Tested acc to: EN 61000-6-3:2001, EN55022:1998, -A1:2000 A2:2003 Class B, EN 61000-3-2:2001 for Emission Tested acc to EN 61000-6-2:2005, SS-EN 55024:1998 +A1:2001 +A2:2003, EN 61000-4-2, -3, -4, -5, -6, 11
	CE-certificate by SWEDAC Accredited Laboratory
Operating System	Microsoft® Windows® XP Professional (SP2)
Sound Card	Integrated Sound Blaster Compatible Sound (AC97 Audio)
Warranty	2 years from date of delivery
Account Management	GCP Std Service

Table 9. Industrial Computer IPC-7220

Parameter	Data
Additional for the Server	
Memory	2 GB DDR memory, PC2-4200/533
Hard Drive 1	HDD 250GB SATA (WD Caviar YS, Server Class)
Hard Drive 2	HDD 250GB SATA (WD Caviar YS, Server Class)
Office SW	Microsoft Office 2003 Professional
License Dongle	Compact HMI 800 only support Dongle based licensing
Additional for Client	
Memory	1 GB DDR memory, PC2-4200/533
Hard Drive	HDD 250 GB SATA 8EWD Caviar YS, Server Class)
Service and Support	
For service see: http://www.pcqt.se/services	

Supported Operating System
Compact HMI 800 SV 4.1 is supported by the following operating system:

- Windows XP Professional for clients and server.

Core System

Scheduling Service

The maximum scheduling capacity is 200 simultaneous jobs per scheduling server.

Softpoint Service

The Softpoint Server can have up to 2500 softpoint objects. Each softpoint object can have up to 100 signals; however, the total number of signals cannot exceed 25,000.

CPU time for each read or write transaction is one millisecond. The Softpoint server can write 10 events per second to platform-based Aspect Objects.

Events

The disk space requirements for event storage is:

- Storage per numeric history value stored: 21 bytes
- Storage per message: 260 bytes

The Event burst capacity is shown in Table 10.

Table 10. Event burst Capacity

Parameter	AS+CS+(AO) with server based client
Continuos alarm throughput/second	20
Event burst (events per 100ms) applied to one Controller	200
Event burst (events evenly distributed over controllers)	600 total over 3 sec.
Event burst recovery time, 1000 events evenly distributed	60 sec.

Calculations

Table 11. Calculations Parameters

Parameter	Description
OPC Base Rate	Rate at which input variables are updated by their respective OPC data sources. Range: 100 milliseconds to 1 hour Default: 1000 milliseconds (1 second)
Cycle Base Rate	Rate at which the Calculations Scheduler scans the list of cyclically scheduled calculations. Range: 100 milliseconds to 1 hour Default: 500 ms (1/2 second)
Number of calculations that may be queued waiting to be executed	10,000 Maximum
Execution Rate	100 calculations/second, see write transaction rates specified below to determine capabilities
Number of Calculation Services	10
Write transactions/second	The Calculation server can write up to 10 values/second to process (AC 800M) objects.
Write transaction/second to softpoints	The Calculation server can write up to 100 values/second to process softpoint objects

OPC Performance

The capacity for number of OPC-items/second to an OPC Client (800xA OPC Client Connection) is shown in Table 12.

Table 12. Number of OPC-items/second to an OPC Client

Parameter	Compact HMI 800
Number of OPC-items/second via afw OPC	25

Control Network Clock Synchronization

Table 13. Control Network Clock Synchronization

Type of Clock Synchronization	Accuracy per node
High Precision SNTP	1 ms
SNTP	200 ms
CNCP (between AC 800M)	1 ms
CNCP (AC 800M to AC 800C/Advant Controller 250)	200 ms
CNCP (AC 800M to PPA)	200 ms

Section 9 Ordering and Licensing

General

One of the goals of this product guide is to help sales representatives when ordering the Compact HMI 800 and its licenses.

This section describes the price lists needed when ordering and provides ordering examples.

However, it is outside the scope of this product guide to give a complete description of all ordering procedures and tools, as well as licensing conditions for other Industrial IT products. Each sales representative is assumed to know how to use price lists, pricing and ordering tools to order.

In order to offer market-appropriate functions & features, structure and pricing, the product is divided in server and client functions. In addition the system is scaled on signals and tags. The number of signals is calculated as the number of signals fetched from the connected controllers, PLCs or other external devices or systems. The number of tags is calculated as the number of aspect objects in the system with more then one faceplate aspect. To simplify the scaling, packages that includes both signals and tags are available. In general a package includes 2.5 signals for each tag.

Note that the server always has to be purchased together with a package of at least 50 tags.

In addition to scaling of signals and tags, the system is scaled based on the number of Workplace clients, to further optimize the product for a specific application. Information about tags and how to calculate them are described in Signal and Tag Calculation on page 78.

Use of the Compact HMI 800 software presupposes that a corresponding licensing is purchased. Any use of the Compact HMI 800 software requires at least one Operator Workplace Server license.

Price List Structure

The Compact HMI 800 offering is described in the Industrial IT Compact HMI 800 SV4.1 Price Book, 3BSE040017/B. It consists of a number of price lists.
See Table 14, Compact HMI 800 version 4.1 Price Lists on page 90.

The price lists and the selling tools have information about purchasable items. Please refer to them for more information.

Note that multiple items in the price lists are required if you need more tags than what is given in one item.

The complete Compact HMI 800 version 4.1 is comprised of the following price lists:

Table 14. Compact HMI 800 version 4.1 Price Lists

Price List Identity	Price List Name
3BSE040680	Compact HMI 800 SV4.1
3BSE040708	Compact HMI 800 SV4.1 Expansion

Information about export control conditions are given in the document 3BSE035412, Export Control Conditions for the Industrial IT System 800xA Software. It is available in the System 800xA Price Book.

User Documentation

User Documentation is available on the Compact HMI 800 delivery media only.

Licensing

A license is required to use licensed ABB software. The SW included in Compact HMI 800 is delivered together with a license that gives the user that right to use the SW. The product also includes 1 year subscription on ABBs Sentinel software maintenance program. This gives the user free upgrades of the software during this period. The period starts at the date of shipping from the factory. The Sentinel agreement can be extended by purchasing the sentinel extension pricelist items.

Software updates

To get access to software upgrades the license owner needs to register as an owner of the license. Information about how to register is delivered together with the software. After registration software updates and product information accessible on the internet.

End User Runtime Licenses

Ordering is made from the price lists and performed as described in Ordering on page 91.

Licenses and license keys are delivered with the product. Extension of the system can be ordered and downloaded from Software Factory, using the Software Factory Web site http://softwarefactory.abb.com, by local ABB personnel, who provide the customer with the license information, or in special cases directly by the customer. An optional way to retrieve the license information is to send a license application form to the supplying delivery center.

The SoftCare support is described in Software Maintenance on page 91.

Ordering

When ordering a Compact HMI 800, use the price list and available ordering tools.

Sales Configurator Wizard for Compact HMI 800

Now a sales wizard for Compact HMI 800, "Wizard Compact Products 800" is available for download. The 800xA Sales configurator Wizard does not support Compact HMI 800.

Software Maintenance

Software Management Program Sentinel combines a software subscription service with basic software support (access to SolutionsBank Foundation).

The Sentinel agreement does not however include:

- HW and Media Preparation for Compact HMI 800.

- 3rd party software upgrades.

The purchase of additional software options as an extension to an existing license is handled in the same way as the initial software order. The Sentinel agreement is connected to the base license**,** so the extension of a license does not extend the Sentinel agreement period.

Software Upgrade

Upgrade of the software in the Comapct HMI 800 is done in two ways.

1. For minor upgrades roll-ups and service packs, the software is available for download in ABB library.
2. New releases of the software will be available as purchasable items for a preparation and media fee. The cost for the license upgrade of the software is included in the softcare agreement.

Roll-ups and service packs

Roll-ups and service packs are installed on top of the software delivered according to the instructions included with the packages. Normally this requires a shutdown and restart of each computer.

New Software releases

New major releases of the software is delivered as ghost images containing the same contents as the delivered images without the system data. The upgrade is done according to the upgrade instructions delivered with the upgrade. This basically includes loading the computer with the new image and restoring the system and other added configuration data.

Normally this includes the following steps:

Server Workplace.

1. Backup of the system on the server,
2. Backup of configuration data for Controller configurations
3. Backup of data for added 3rd party software like OPC servers etc.
4. Computer shutdown and restore from delivered upgraded Ghost image
5. Installation of additional 3rd party software

6. Make additional adaptations like IP addresses etc.
7. Restore of data for controller configuration
8. Restore of data for 3rd party software
9. Restore of system backup on the server
10. Make a Ghost dump of the computer
11. Restart of computer

Client Workplaces

1. Backup of data for added 3rd party software.
2. Computer shutdown and restore from delivered upgraded Ghost image
3. Installation of additional 3rd party software
4. Make additional adaptations like IP addresses etc.
5. Restart of computer

Life Cycle Policy

Product versions are tied to separate price lists. This means the version delivered is controlled by which price list it was ordered from.

The software for a product version is actively maintained as long as the product version is actively sold - the version is in an active phase. When a new major version is released, the previous major version is still supported for a number of years. This means critical errors will be corrected, service packs may be planned, and Microsoft security updates will be verified. There will be no updates as to what operating system the version is running on.

After the supported period the version becomes retired. It may still be possible to do corrections to a retired product version. Such maintenance is normally charged for.

Eventually, when a product version is no longer possible to maintain, for technical and/or economical reasons, it will become obsolete.

At revisions (service packs) the replaced revision will normally go immediately into retired phase. However, this policy will not be put in place until it is possible to upgrade to the next revision without shutting down the system.

INDEX

S

T

U

V

3BSE041037R4201/F. Printed in Sweden February 2008

http://www.abb.com

Automation Technology Products
Wickliffe, Ohio, USA
www.abb.com/controlsystems

Automation Technology Products
Västerås, Sweden
www.abb.com/controlsystems

Automation Technology Products
Mannheim, Germany
www.abb.de/controlsystems