

T315C

System 800xA with AC 800M

Engineering, Part 1 – Control Builder

Course goal

The goal of this course is to learn the engineering of a complete control project using the Extended Automation System 800xA with AC 800M controllers and Control Builder as the engineering tool. Note that this course is split in two parts and the follow-up course is T315H for the Human System Interface (HIS) configuration.

Learning objectives

Upon completion of this course the participants will be able to:

- Explain the System 800xA architecture and the function of the different components
- Navigate in the system and create new objects / aspects
- Create a new control project and plan the structure of application programs based on a P&ID and a Functional Specification
- Configure the AC 800M hardware and corresponding I/O's
- Handle the standard libraries provided by ABB and develop project specific libraries
- Design and configure application programs by using a variety of IEC 61131-3 languages
- Define tasks and describe the assignment rules
- Analyze the controller diagnostics and optimize the CPU load / memory usage
- Configure user defined object types
- Setup communication using various protocols
- Setup the OPC connectivity to AC800M

Participant profile

This training is targeted to system and application engineers, commissioning and maintenance personnel, service engineers and system integrators.

Prerequisites

Students shall know the fundamentals of working with Control Systems and have basic knowledge of Windows XP and networking technologies.



Topics

- System 800xA architecture
- Engineering Workplace / Plant Explorer
- Project and application structures
- AC 800M hardware
- Project backup
- Libraries
- Variables and data types
- Function Block Diagram
- Structured Text
- Task assignment and memory
- Control Modules
- User defined object types
- Sequential Function Charts (SFC)
- Communication
- OPC connectivity

Course type and methods

This is an instructor led course with interactive classroom discussions and associated lab exercises. Approximately 50% of the course is hands-on lab activities.

Duration

The duration is 5 days.

Course outline

Day 1	Day 2	Day 3	Day 4	Day 5
- Course overview - System 800xA architecture - Engineering Workplace / Plant Explorer - Project and application structures - AC 800M hardware	- AC 800M hardware - Project backup - Libraries - Variables and data types - Function Block Diagram - Structured Text	- Structured Text - Task assignment and memory - Control Modules	- User defined object types - Sequential Function Charts (SFC)	- Communication - OPC connectiviy

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T315H

System 800xA with AC 800M

Engineering, Part 2 – Human System Interface

Course goal

The goal of this course is to learn the engineering of a complete control project using the Extended Automation System 800xA with AC 800M controllers and Control Builder as the engineering tool. Note that this course is split in two parts and the pre-course is T315F or T315C for the controller configuration.

Learning objectives

Upon completion of this course the participants will be able to:

- Build up a plant model in the Functional and Location Structure
- Configure process graphic displays and define navigation links
- Modify faceplates and create graphic elements
- Manage and configure alarm and events
- Configure external alarms and alarm printers
- Set up the historical data collection and configure trend displays
- Create and customize Operator Workplaces
- Configure user accounts and describe how access rights work
- Backup and restore System 800xA data
- Use the import / export tool
- Create simple reports using MS Excel Data Access
- Use bulk data handling with templates
- Describe the NLS principles

Participant profile

This training is targeted to system and application engineers, commissioning and maintenance personnel, service engineers and system integrators.

Prerequisites

Students should have attended either the course T315C "Engineering with Control Builder" or the course T315F "Engineering with Function Designer" or have knowledge and experience associated with the content of these courses.



Topics

- Plant modelling
- Graphic displays
- Graphic elements
- Faceplates
- Alarm and events
- Historical data collection
- Trend displays
- Operator Workplace
- User security
- Backup and restore
- Import and export
- Simple reports
- Document manager
- National Language Support (NLS)
- Bulk data handling

Course type and methods

This is an instructor led course with interactive classroom discussions and associated lab exercises. Approximately 50% of the course is hands-on lab activities.

Duration

The duration is 5 days.

Course outline

Day 1	Day 2	Day 3	Day 4	Day 5
- Course overview - Plant modelling - Graphic displays - Graphic elements	- Faceplates - Alarm and events	- Historical data collection - Trend displays - Workshop "Engineering"	- Operator Workplace - User security - Backup and restore - Import and export	- Simple reports - Document manager - National Language Support (NLS) - Bulk data handling

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Course description

T315F

System 800xA with AC 800M Engineering, Part 1 – Function Designer

Course goal

The goal of this course is to learn the engineering of a complete control project using the Extended Automation System 800xA with AC 800M controllers and Function Designer as the engineering tool. Note that this course is split in two parts and the follow-up course is T315H for the Human System Interface (HSI) configuration.

Learning objectives

Upon completion of this course the participants will be able to:

- Explain the System 800xA architecture and the function of the different components
- Navigate in the system and create new objects
- Create a new control project and plan the structure of application programs based on a P&ID and a Functional Specification
- Configure the AC 800M hardware and corresponding I/O's
- Setup the OPC connectivity to AC800M
- Analyze the controller diagnostics and optimize the CPU load / memory usage
- Create function diagrams, allocate them and generate the controller code
- Display and change values in online mode
- Analyze the work methodology using project specific templates
- Generate the MMS cross communication and describe the communication for various protocols
- Create simple sequences using SPL
- Parameterize signal objects and allocate them

Participant profile

This training is targeted to system and application engineers, commissioning and maintenance personnel, service engineers and system integrators.

Prerequisites

Students shall know the fundamentals of working with Control Systems and have basic knowledge of Windows 8 and networking technologies.



Topics

- System 800xA architecture
- Engineering Workplace / Plant Explorer
- Project and application structures
- AC 800M hardware
- Project backup
- Libraries
- OPC connectivity
- Task assignment and memory
- Variables and data types
- Function Designer concepts
- Engineering with Function Designer
- Function Designer templates
- Sequential Programming Language (SPL)
- Communication
- User defined object types (optional)

Course type and methods

This is an instructor led course with interactive classroom discussions and associated lab exercises. Approximately 50% of the course is hands-on lab activities.

Duration

The duration is 5 days.

Course description

T315F

System 800xA with AC 800M Engineering, Part 1 – Function Designer

Course outline

Day 1	Day 2	Day 3	Day 4	Day 5
■ Course overview ■ System 800xA architecture ■ Engineering Workplace / Plant Explorer ■ Project and application structures ■ AC 800M hardware	■ AC 800M hardware ■ Project backup ■ Libraries ■ OPC connectivity ■ Task assignment and memory ■ Variables and data types	■ Function Designer concepts ■ Engineering with Function Designer	■ Engineering with Function Designer ■ Function Designer templates ■ Sequential Programming Language (SPL)	■ Sequential Programming Language (SPL) ■ Communication ■ User defined object types (optional)

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Course description

CN382

System 800xA Maintenance and Troubleshooting

Course goal

The goal of this course is to learn how to install and administer an Extended Automation System 800xA. It covers the Core System, but not the additional options such as Batch etc.

Learning objectives

Upon completion of this course the participants will be able to:

Plan a complete system architecture and state the system limits

- Create Windows users and configure the link to System 800xA
- Configure access rights on Windows and 800xA level with group policies, roles and permissions
- Setup audit trail functionality
- Design and setup a redundant automation network
- Configure and maintain redundant servers
- Set up clock synchronization to AC 800M
- Configure IT assets
- Configure Windows Domains / Workgroups
- Restore crashed domain controllers
- Troubleshoot network problems using standard windows tools
- Check consistency on Redundant Aspect servers

Participant profile

This training is targeted to system engineers, administrators and system integrators.

Prerequisites

Students should have attended the Engineering course T315 or have knowledge and experience associated with the content of these courses. In addition, they should have attended the courses MS2151 / MS2152 or have equivalent experience.

Topics

- System architecture
- System planning
- Audit trail
- Network setup
- Server redundancy
- PC & Network monitoring (IT assets)
- Time synchronization
- Backup / restore
- Trouble shoot alarm problems, understand alarm event architecture
- Domain setup
- Troubleshoot and analyze domain controllers
- System Troubleshooting
- Restore crashed domain controllers

Course type and methods

This is an instructor led course with interactive classroom discussions and associated lab exercises. Approximately 50% of the course is hands-on lab activities.

Duration

The duration is 5 day

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Course description

T305 System 800xA Administration and Installation

Course goal

The goal of this course is to learn how to install and administer an Extended Automation System 800xA. It covers the Core System, but not the additional options such as Batch etc.

Learning objectives

Upon completion of this course, students will be able to:

- Plan a complete system architecture and state the system limits
- Design and setup a redundant automation network
- Configure IT assets
- Create Windows users and configure the link to System 800xA
- Configure access rights on Windows and 800xA level with group policies, roles and permissions
- Lock down an Operator Workplace
- Setup audit trail functionality
- Configure and maintain redundant servers
- Set up clock synchronization to AC 800M
- Backup and restore complete 800xA systems
- Configure Windows Domains / Workgroups
- Install and license the System 800xA software
- Collect diagnostic log files

Participant profile

This training is targeted to system engineers, administrators and system integrators.

Prerequisites

Students should have attended either the Basic Configuration course T314 or the Engineering course T315 or have knowledge and experience associated with the content of these courses. In addition, they should have attended the basic Microsoft courses for Windows 2003 Server or have equivalent experience.



Topics

- System architecture
- System planning
- Network setup
- PC & Network monitoring (IT assets)
- OPC communication
- 800xA security
- Operator Workplace restrictions
- Audit trail
- Server redundancy
- Time synchronization
- Backup / restore
- Domain setup
- System installation
- Diagnostics / Preventative maintenance

Course type and methods

This is an instructor led course with interactive classroom discussions and associated lab exercises. Approximately 50% of the course is hands-on lab activities.

Duration

The duration is 5 days.

Course outline

Day 1	Day 2	Day 3	Day 4	Day 5
- Course overview - System architecture - System planning - Network setup - PC & Network monitoring (IT assets)	- OPC communication - 800xA security - Operator Workplace restrictions	- Audit trail - Server redundancy - Time synchronization - Backup / restore	- Backup / restore - Domain setup - System installation	- System installation - Diagnostics - Preventative maintenance

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T307

System 800xA Batch Management Engineering and Operation

Course goal

The goal of this course is to learn the operation and engineering of the Batch Management provided by the Extended Automation System 800xA.

Learning objectives

Upon completion of this course, the participants will be able to:

- Explain the Procedural model and Equipment model
- Describe the modes and states according to ISA S88.01
- Schedule and monitor batches
- Control and operate batch procedures in auto, semi-auto and manual mode
- Configure Procedure Function Charts on various level of complexity
- Allocate resources and handle transfers
- Edit recipes in run-time
- Configure exception handling
- Describe the integration of Batch Management with the AC 800M controller
- Analyze historical batch data collection
- Configure reports in MS Excel

Participant profile

This training is targeted to commissioning and maintenance personnel, production managers, operators, process and application engineers.

Prerequisites and Recommendations

Students should have attended either the Basic Configuration course T314 or the Engineering course T315 or have knowledge and experience associated with the content of these courses.



Topics

- Overview 800xA Batch Management
- Introduction to ISA S88
- Scheduling a single unit batch
- Controlling a single unit procedure
- Manual phase control
- Batch historical data
- Configuring simple unit recipes
- Configuring complex unit recipes
- Runtime-edit procedures
- Exception handling
- Link Batch Management to AC 800M
- Production recipes
- Reports
- Miscellaneous

Course type and methods

This is an instructor led course with interactive classroom discussions and associated lab exercises. Approximately 50% of the course is hands-on lab activities.

Course duration

The duration is 5 days.

T307

System 800xA Batch Management Engineering and Operation

Course outline

Day 1

- Course overview
 - Overview 800xA Batch Management
 - Introduction to S88
 - Scheduling a single unit batch
-

Day 2

- Controlling a single unit procedure
 - Manual phase control
 - Batch historical data
-

Day 3

- Configuring simple unit recipes
 - Configuring complex unit recipes
 - Runtime-edit procedures
-

Day 4

- Exception handling
 - Link Batch Management to AC 800M
 - Production recipes
-

Day 5

- Production recipes
 - Reports
 - Miscellaneous
-

T308

System 800xA with AC 800M

Hardware Maintenance and Troubleshooting

Course goal

The goal of this course is to learn how to troubleshoot and maintain the AC 800M hardware in an Extended Automation System 800xA. On the last day of the course, the tools and methods learned will be applied to some typical use cases which might appear in practice.

Learning objectives

Upon completion of this course, the participants will be able to:

- Explain the System 800xA architecture and the function of the different components
- Operate objects through faceplates
- Handle alarms
- Navigate in the Project Explorer
- Describe the structure of application programs i.e. variables, libraries, programs, tasks
- Configure the AC 800M hardware and corresponding I/O's
- Load the controller and work in online mode
- Troubleshoot and exchange AC 800M hardware
- Troubleshoot PROFIBUS and ModuleBus communication to the S800 I/O's
- Trace signals in Control Builder applications using different programming techniques
- Troubleshoot the OPC communication to the AC 800M controller
- Trace alarms from the Human System Interface (HIS) down to control logic

Participant profile

This training is targeted to first level maintenance personnel.

Prerequisites

Students shall know the fundamentals of working with Control Systems and have basic knowledge of Microsoft Windows 7.



Topics

- Course introduction
- System 800xA architecture
- Operation
- AC 800M hardware
- Controller preparation
- Control Builder overview
- Plant Explorer Workplace
- Hardware troubleshooting
- Search and navigation
- Signal tracing in Function Block Diagram
- Signal tracing in Structured Text
- Signal tracing in Control Modules
- Signal tracing in Sequential Function Charts
- Signal tracing in Diagrams
- Signal tracing from 800xA Workplace
- Troubleshooting (use cases)

Course type and methods

This is an instructor led course with interactive classroom discussions and associated lab exercises. Approximately 50% of the course is hands-on lab activities.

Course duration

The duration is 5 days.

T308

System 800xA with AC 800M

Hardware Maintenance and Troubleshooting

Course outline

Day 1

- Course overview
 - System 800xA architecture
 - Operation
 - AC 800M hardware
 - Controller preparation
-

Day 2

- Control Builder overview
 - Plant Explorer Workplace
 - Hardware troubleshooting
 - Search and navigation
-

Day 3

- Signal tracing in Function Block Diagram
 - Signal tracing in Structured Text
 - Signal tracing in Control Modules
 - Signal tracing in Sequential Function Charts
-

Day 4

- Signal tracing in Diagrams
 - 800xA Status Monitoring
 - MMS communication
 - Signal tracing from 800xA Workplace
-

Day 5

- Troubleshooting (complex cases)

T309

System 800xA Safety - AC 800M High Integrity Configuration and Maintenance

Course goal

The goal of this course is to learn the configuration and maintenance of the Extended Automation System 800xA with AC 800M High Integrity controller

Learning objectives

Upon completion of this course the participants will be able to:

- Describe the requirements for a SIL certified application and explain the different SIL levels
- Use the Safety manual as important document
- Describe the function of the AC 800M High Integrity components
- Configure the AC 800M HI controller with the corresponding I/O's
- Set up safety relevant controller settings and explain the execution in the controller
- Maintain and troubleshoot an HI controller, incl. firmware online upgrades
- Configure SIL2 / SIL3 applications by using standard libraries and describe the purpose of VMT and CTA applications
- Modify applications taking into account safety relevant topics
- Configure the access management
- Create communications between SIL applications
- Create Fire & Gas application by using the FireGasLib and SupervisionLib (optional)
- Set up and exchange redundant HI controllers

Participant profile

This training is targeted to system and application engineers, commissioning and maintenance personnel, service engineers and system integrators.

Prerequisites

Students should have attended the Engineering course T315 or have knowledge and experience associated with the content of this course. The required knowledge should be verified via the basic level user certification "Engineering using AC 800M". Basic knowledge of safety implemented systems is an advantage.



Topics

- Functional safety introduction
- Safety standards
- SIL levels
- AC 800M HI hardware
- Hardware configuration
- Controller settings
- SIL marked applications for: Emergency Shutdowns / Burners
- Access management (modify parameters, download applications etc.)
- Communication between SIL applications
- Fire & Gas application (optional)
- Maintenance and troubleshooting
- Redundancy
- Safety manual

Course type and methods

This is an instructor led course with interactive classroom discussions and associated lab exercises. Approximately 50% of the course is hands-on lab activities.

Duration

The duration is 4 days.

Course outline

Day 1	Day 2	Day 3	Day 4
- Course overview - Safety standards - SIL levels - AC 800M HI hardware - Hardware configuration	- Controller settings - SIL marked applications	- SIL marked applications - Access management - Communication between SIL applications	- Fire & Gas application (optional) - Maintenance and troubleshooting - Redundancy

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T310

System 800xA Operation

Course goal

The goal of this course is to learn how to operate and navigate in the Extended Automation System 800xA with AC 800M controllers.

Learning objectives

Upon completion of this course, students will be able to:

- Explain the System 800xA architecture and the function of the different components
- Navigate in a standard Operator Workplace by using Aspect Objects technology
- Read and interpret information from different process displays
- Monitor and control standard process objects through faceplates
- Handle alarm and event lists
- Acknowledge alarms
- Operate trend displays and interpret the information
- Monitor and control sequences based on Sequence Function Charts
- Describe how access rights are handled and log in as different users

Participant profile

This training is targeted to operators.

Prerequisites

Students shall know the fundamentals of working with Control Systems and have basic knowledge of Windows 2000.



Topics

- System 800xA architecture
- Operator Workplace
- Navigation
- Process displays
- Faceplates
- Alarm and Events
- Historical data and trends
- Sequences
- Access rights

Course type and methods

This is an instructor led course with interactive classroom discussions and associated lab exercises. Approximately 50% of the course is hands-on lab activities.

Duration

The duration is 2 days.

Course outline

Day 1	Day 2
- Course overview - System 800xA architecture - Operator Workplace - Navigation - Process displays - Faceplates	- Alarm and Events - Historical data and trends - Sequences - Access rights

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T314

System 800xA with AC 800M

Basic Application Modifications

Course goal

The goal of this course is to learn the modification of existing applications / projects using the Extended Automation System 800xA with AC 800M controllers. If more comprehensive engineering skills are needed, it is recommended to consider the course T315 "Engineering" instead.

Learning objectives

Upon completion of this course the participants will be able to:

- Explain the System 800xA architecture and the function of the different components
- Configure the AC 800M hardware and corresponding I/O's
- Describe the structure of application programs i.e. variables, libraries, programs, tasks
- Modify existing application programs by using Function Block Diagrams, Sequential Function Charts, Structured Text and Control Modules
- Setup the communication between controllers
- Load the controller and work in online mode
- Check the OPC connectivity to AC800M
- Navigate in the system and create new objects / aspects
- Modify graphic displays
- Manage and configure alarm and events
- Monitor trends and configure historical data collection
- Describe the use of Function Designer
- Import / export System 800xA data

Participant profile

This training is targeted to system engineers, commissioning and maintenance personnel, and service engineers who need have a foundation for maintenance and administration skills.

Prerequisites

Students shall know the fundamentals of working with Control Systems and have basic knowledge of Windows XP and networking technologies.



Topics

- System 800xA architecture
- Engineering Workplace / Plant Explorer
- OPC connectivity
- Application structures
- AC 800M hardware
- Variables and data types
- Function Block Diagram
- Structured Text
- Control Modules
- Sequential Function Charts (SFC)
- Communication
- Alarm and events
- Historian and trends
- Graphic displays
- Operator Workplace
- Import and export
- Function Designer

Course type and methods

This is an instructor led course with interactive classroom discussions and associated lab exercises. Approximately 50% of the course is hands-on lab activities.

Duration

The duration is 5 days.

Course outline

Day 1	Day 2	Day 3	Day 4	Day 5
- Course overview - System 800xA architecture - Operation - Engineering Workplace / Plant Explorer - OPC connectivity	- AC 800M hardware - Libraries - Variables and data types - Function Block Diagram	- Structured Text - Task assignment and memory - Control Modules - Sequential Function Charts (SFC)	- Control Modules - Communication - Alarm and events - Graphic displays - Historian and trends	- Operator Workplace - Import and export - Function Designer

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