

EDUCATIONAL SERVICES

Maximize your Investment!



2013 Global Training Offerings

Emerson Training Center Courses
Regional Classes
On-Site Training
eLearning
Virtual Classroom



Director's Message:

We are pleased to provide you with our Educational Services course catalog from Emerson Process Management. Our instructor led courses and e-learning offerings are designed to help you run your plant operations with greater workforce effectiveness. Whether you are looking for specific industry application expertise or product knowledge, we have courses to help you engineer, operate, maintain, and manage industrial process control devices and systems to achieve peak plant and process performance.



Emerson Educational Services has been training personnel for over 65 years and we remain committed to providing quality training to our customers, when and where they need it. Today we have over 55 certified training locations in 34 different countries to provide training that you can count on. Our certification program for instructors, courseware and training hardware along with adherence to education standards set by the International Association for Continuing Education & Training (IACET) ensures you of knowledgeable and skilled trainers delivering current information on state-of-the-art technology from Emerson Process Management.

We encourage you to use our website as a resource for announcements on new offerings, current listing of courses with dates / locations, and information on all of our worldwide training centers. Please contact us or your local Emerson sales representative for further information or assistance in helping you define the programs to best address your training needs.

A handwritten signature in black ink that reads "Dorothy Hellberg". The signature is fluid and cursive, with the first name being the most prominent.

Dorothy Hellberg
Director Educational Services
Emerson Process Management

Emerson's Virtual Classroom – Maximize your investment!



Connect from anywhere to Emerson's Virtual Classroom to receive live, instructor led training without the cost and inconvenience of travel.

Virtual Classroom – delivering value based instruction to your desktop via a virtual classroom with live instructor interaction with full access to DeltaV™ or Syncade™ systems. Save time and travel related expenses. Achieve your training goals by utilizing Emerson's Virtual Classroom.

Introduction

Emerson's Virtual Classroom delivers traditional courseware from certified instructors with access to fully functional systems via the internet. Now you can garner the benefits of Emerson's training without leaving your office or home!

Emerson uses Adobe® and GoToMyPC® technology to provide a rich training environment that is easy to use. Emerson's certified Instructors deliver the curriculum through the Adobe Connect meeting room with full audio and video support. You can pose questions directly to the instructor or share them with the entire classroom.

Emerson facilitates your hands-on, learn by doing experience by connecting students directly to a system located in a factory classroom using the GoToMyPC technology. Utilize Emerson's virtual classroom capability to achieve outstanding results without the costs typically associated with factory based training.

Benefits

Convenient: Accomplish your training from work, home or anywhere with an internet connection. With Emerson's Virtual Classroom you have access to your systems, instructors and curriculum from anywhere in the world. Imagine taking a class from the comfort of your home without the lost time and hassles of travel, airports and hotels.

Savings: Today everyone is looking for best cost options without sacrificing quality. Emerson provides the same curriculum from the same professional staff on the same systems you would use if you were taking the class at the factory school.

Quality Instruction: Emerson's Factory certified instructors lead every class using the same learn by doing methodologies. Because each student has access to a system, they can participate in workshops, explore and experiment. Students can also think longer about what they want to say and add their comments when ready.

Content Flexibility: Because the classes originate from the factory, you have greater flexibility in defining special or custom content to suit your training needs. Emerson's Virtual Classroom facilitates multiple subject matter expert availability from one location.

The Following Classes are Available for Virtual Classroom. Call to Discuss Options for Additional Offerings or On-Site Training.

- 7009 - DeltaV Implementation I
- 7012 - DeltaV Operate Continuous
- 7014 - DeltaV Operate Batch
- 7016 - DeltaV Batch Implementation
- 7017 - DeltaV Implementation II
- 7025 - DeltaV Advanced Graphics
- 7201 - DeltaV Advanced Control
- 7202 - DeltaV Model Predictive Control
- 7305 - DeltaV SIS Implementation
- 7080 - Syncade Suite Overview
- 7081 - Syncade Suite Document Control and Archiving
- 7082 - Syncade Suite Training and Development
- 7083 - Syncade Suite Equipment Tracking
- 7084 - Syncade Suite Materials, Inventory and Order Management
- 7095 - Syncade Suite Recipe Authoring 4.0

www.emersonprocess.com/education <Select > Virtual Learning - 800-338-8158 - education@emerson.com

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New challenges. New responses.

Our global organization is available to work with you in defining the appropriate subject matter and right approach to satisfy your training needs. Each year thousands of individuals attend courses at one of our regional training centers, or participate in classes tailored to their particular needs and conducted locally or at their plant. Online learning courses are very cost effective and cover a variety of topics giving your employees greater flexibility to complete their training on their schedule. Employees can choose online self-study e-learning courses and/or live virtual instructor-led courses with the same world-class instructors that teach in the classroom.

Factory Training

Emerson Process Management hosts Factory Training courses in which the student will attend class in our fully equipped training laboratory. Our courses include small group hands-on sessions, one-on-one time with instructors, and a facility tour at some factory locations. Our workshops are simply the best investment you can make today in your employees and your business. www.emersonprocess.com/education

Regional Training Centers

With over a half a century of training experience, Educational Services remains committed to providing quality training to our customers, when and where they need it. Individuals can attend courses at one of our worldwide regional training centers or participate in one of the schools we conduct at a local sales or service office.

www.emersonprocess.com/education [Quick Links - Contacts/Training Centers](#)

On-site, Local Training

Emerson Process Management develops hundreds of customized courses each year for our customers. You get targeted training that really works for you. Consider on-site training if:

- You need to train several people at once
- You need training focused on a specific issue unique to your organization
- You're looking for an alternative to sending employees off-site, incurring expensive travel and lodging costs

We take all the guesswork and worrying about details out of the equation. You let us know what training your group needs, where you'd like the training to be presented and when. We handle everything else. Our on-site representatives are uniquely qualified to help you decide whether on-site training makes sense for your organization. Contact us today so we can train your team tomorrow! **Call to Discuss: 800-338-8158 or 641-754-3771**



Virtual Classroom deliver value based instruction to your desktop via a virtual classroom with live instructor interaction and full access to an actual DeltaV system for hands-on. Save time and travel related expenses. Achieve your training goals by utilizing Emerson's Virtual Classroom. www.emersonprocess.com/education [Virtual Classroom](#)

eLearning Courses are a convenient and flexible way to help manage your time and costs.

Browse an online catalog of the latest eLearning courses on a variety of technical topics:

- View samples of course material
- All courses are deployed using the very latest (flash based) technology
- Courses are accessed via an internet browser
- Email address is required
- Access to courses for a minimum of 90 days (longer as needed)
- Courses can also be purchased in CD format, or for deployment on your internal (LMS) Learning Management System



You can purchase directly from the eStore with a credit card for immediate access or call 800-338-8158 or 641-754-3771 to provide a check or PO. Select and purchase eLearning courses at

www.emersonprocess.com/education [Quick Links - Blended Learning](#)

Training Materials

AMS Device Manager Training Modules and Legacy Video Training Materials may be used in a variety of applications. In addition to being well-suited to individual self-study, they may be used as the basis for... or supplement to... instructor-led sessions. A video tape can often illustrate important concepts, principles, and relationships much more clearly than traditional classroom methods. **Learn More, www.emersonprocess.com/education [Course Offerings - Training Material](#)**

PLANT OPTIMIZATION



Today's plant is a myriad of process control hardware and software. Everything from valves to compressors, from level measurement devices to real-time data servers, and from boilers to condensers. Just operating this collection of technologies is challenging. Making them all work together at their best to produce the best product at a profit is a daunting task. It takes more than just monitoring the process to be successful. It takes optimizing the devices and the process together in the right environment with people who have a clear understanding of both.

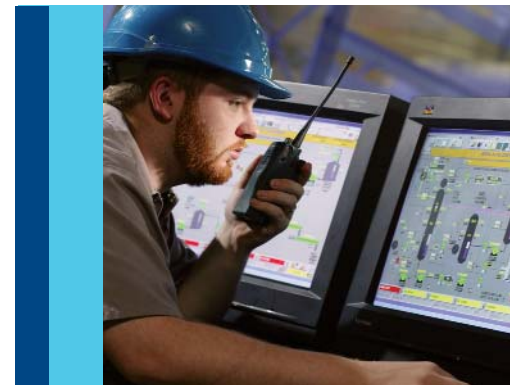
Working in a plant for long periods of time can create "legacy thinking," where even when it is in the best interest to change, nobody can bring themselves to do so because "that's the way we've always done it." Emerson's Educational Services offerings can show how to optimize existing equipment with new methods and technology.

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Virtual Classroom Available
Introducing Virtual Classroom, details on page 85. Courses can be arranged to fit your schedule.

On-Site Training can also be scheduled in your area or at your site. Please call to discuss options at 800-338-8158 or 641-754-3771.



AMS Device Manager**Course 7020 CEUs: 2.1****Overview**

Completing 3-days of AMS Device Manager hands-on instructor assisted training modules and exercises, provides the quickest route to your productive use of this predictive maintenance application. The training exercises focus on skills required by engineers and technicians, and are based on real-world tasks that most users will encounter on the job.

7020-1 Configuring and Using AMS Device Manager

- Viewing and Modifying Devices
- Creating a Plant Database Hierarchy and Adding Devices
- Field Communicator - AMS Device Manager
- AMS Device Manager Browser Functions
- Audit Trail
- Calibrating Device - Calibration Assistant
- Configuring and Monitoring System Alerts

7020-2 System Administration

- AMS Device Manager System Overview
- Installing an AMS Device Manager Server Plus Standalone
- Starting AMS Device Manager for the First Time
- Network Communication Interface Setup
- AMS Device Manager Database Management
- Installing a Distributed System
- Installing Device Types from Media

7020-3 SNAP-ON™ Applications

- AMS ValveLink® SNAP-ON Application-Basics
- MV Engineering Assistant SNAP-ON Application - Basics
- AMS Wireless SNAP-ON Application
- QuickCheck™ SNAP-ON Application
- Using AMS Device Manager OPC Server and the Matrikon OPC Explorer
- AMS Device Manager Web Services
- AlertTrack SNAP-ON Application

This instructor assisted course is operated in a hands-on, self-paced environment, which allows the student to work at their individual pace. Training can also be delivered at your plant with the help of our certified instructors. AMS Device Manager modules may be purchased for self-study for \$195 each or \$495 for all three paper/bound modules.

To Order

Please contact your local sales representative or visit site below to locate your regional office:
<http://www2.emersonprocess.com/en-US/brands/fisher/Contacts/Pages/Contacts.aspx>

AMS Suite Intelligent Device Manager Primer**Course e7020 NEW CEUs: .2****Audience**

This course is for maintenance personnel and managers responsible for understanding the benefits of using the AMS Suite Intelligent Device Manager. This is a 2-hour (average) on-line course with AMS Device Manager screens including interactive practice sessions, workshops, demonstrations, audio presentations and quizzes.

Topics

- Be Able to Identify Areas that AMS Device Manager could be used to:
 - Speed-Up Start-Ups and Commissioning
 - Improve Quality and Uptime
 - Reduce Costs – Both Fixed and Operating
 - Simply Safety System Use and Compliance Including Start-Ups
- Identify and Navigate the AMS Device Manager's Screens

www.emersonprocess.com/education
 Quick Links - Click to eStore: Blended Learning

Available early 2013. Visit our website at:
www.emersonprocess.com/education
 for details.

**AMS Device Manager with Rosemount HART Instruments****Course 7021 CEUs: 2.1**

Learn the installation, calibration, maintenance, and troubleshooting of measurement instrumentation using AMS Device Manager. The hands-on focus is on skills required by engineers, technicians, or others that are new to the plant or instrument environment.

Overview

This 3-day course teaches maintenance and calibration of measurement devices using AMS Device Manager software to communicate and track information. The student will learn how pressure and temperature transmitters function, are installed, and calibrated using AMS Device Manager. The course uses hands-on training, labs, and lecture to teach the student how to:

- configure and use AMS Device Manager
- correctly perform transmitter installation and setup procedures
- properly configure SMART transmitters
- properly calibrate transmitters
- perform basic troubleshooting-transmitters

Topics

- Configuring and Using AMS Device Manager
- HART Communication
- SMART Transmitters (3051C, 3144P)
- Test Equipment Selection
- Transmitter Installation
- Transmitter Configuration
- Transmitter Calibration
- AMS Device Manager Calibration Assistant SNAP-ON
- Intelligent Calibrators
- Transmitter Troubleshooting

AMS Device Manager with Fisher HART Instrumentation

Course 7022 CEUs: 2.1

This 3-day course is designed to teach technicians and engineers how to commission, calibrate, configure, maintain, and troubleshoot Fisher smart devices using AMS Device Manager and the AMS ValveLink SNAP-ON.

Overview

The course begins with an introduction to the features and functionality of the AMS Device Manager software. It delves into device-specific techniques for commissioning, maintaining, and troubleshooting the following Fisher smart devices:

- DVC6000 Digital Valve Controller
- DLC3000 Digital Level Controller

Prerequisites

None, though a basic familiarity with Fisher smart devices will be beneficial.

Topics

- Introduction to AMS Device Manager
- Getting Started with AMS Device Manager
- Replacing and Deleting Devices
- Field Communicator
- Using the Audit Trail
- Monitoring System Alerts
- DVC6000 View from AMS Device Manager
- AMS ValveLink SNAP-ON Features and Functionality
- AMS ValveLink SNAP-ON Digital Valve Controller Diagnostics

Fieldbus Measurement Instruments

Course 2370 CEUs: 2.8

This course is for individuals responsible for installing, configuring, calibrating, and troubleshooting FOUNDATION™ fieldbus measurement devices.

Overview

This 4-day class covers the integration of FOUNDATION™ fieldbus compliant measurement devices using the Field Communicator, AMS Device Manager and other hosts. Upon completion of this course students will be able to: install, configure, calibrate, and troubleshoot Rosemount Fieldbus devices which include the 3051C and 3051S Pressure transmitters, 644, 3144P and 848 Temperature transmitters, 8742/8732 Magnetic Flow transmitter, 8800 Vortex Flow transmitter, 5600, 5400 and 5300 Radar Level Transmitters, and 752 Indicator.

Prerequisites

Experience in instrument calibration, maintenance, installation and operation would be helpful.

Topics

- FOUNDATION™ fieldbus Overview
- Fieldbus: Wiring/Segment Design/Function Blocks
- Field Communicator Operation
- AMS Device Manager Operation
- Theory of Operation, Installation, Configuration, Maintenance, Calibration and Troubleshooting on the following:
 - 3051C Pressure Transmitter
 - 3051S Pressure Transmitter
 - 3144P, and 644 Temperature Transmitters
 - 848 Temperature Transmitter
 - 8742/8732 Mag Flow Transmitter
 - 8800 Vortex Transmitter
 - 5600/5400/5300 Radar Level Transmitter
 - 752 Fieldbus Indicator

Note: Course may be conducted using other Fieldbus Hosts, such as AMS Device Manager.



To enroll in Plant Optimization courses please call 800-338-8158 or 641-754-3771. For additional contact information refer to the appropriate contact on page 109. Updated dates & locations are available on our website at www.emersonprocess.com/education.

Fieldbus Devices

Course 7030 CEUs: 2.8

This course is for individuals responsible for maintaining, troubleshooting, calibrating and modifying FOUNDATION™ fieldbus device parameters.

Overview

This 4-day lecture/lab course provides maximum hands-on experience working with FOUNDATION™ fieldbus instruments such as: the FIELDVUE® Digital Valve Controller, Rosemount Pressure and Temperature Transmitters. The student will use the DeltaV control system to commission fieldbus devices, assign foundation fieldbus function blocks to field devices, troubleshoot using diagnostics and AMS Device Manager to manipulate device parameters.

Prerequisites

There are no prerequisites for this course; however, a general understanding of process control including control valves, transmitters, control terms, and control loop basics is recommended. Computer skills should include a basic working knowledge of Windows.

The 375/475 Field Communicator and AMS ValveLink for Fieldbus will be demonstrated and available for students as optional activities.

Topics

- DeltaV Scaleable System Overview
- Macro Cycle Execution
- Fieldbus Function Blocks
- FieldVue Theory of Operation
- Transmitter Theory of Operation
- AMS Device Manager Methods
- Fieldbus Wiring Practices
- System Troubleshooting
- Accessing Fieldbus Devices
- Alarms and PlantWeb Alerts at DeltaV Workstations
- Segment Checkout Procedures
- Replace Wizard

Fieldbus Systems and Devices

Course 7032 CEUs: 2.8

This course is for individuals responsible for installing, troubleshooting, calibrating and configuring FOUNDATION™ fieldbus instruments and control strategies using the DeltaV™ scaleable systems.

Overview

This 4-day lecture/lab provides maximum hands-on experience working with the integration of FOUNDATION™ fieldbus devices and the DeltaV scaleable system. The student will be able to install fieldbus instruments and segment checkout for the correct operation of the physical layer. The student will be able to use the DeltaV system to perform AMS Device Manger methods such as calibration, setup wizards, zero trim and diagnostics. The student will be able to implement a pressure loop using FOUNDATION™ fieldbus function blocks with the DeltaV Control Studio application. The student will configure PlantWeb Alerts and device alarm parameters.

Prerequisites

Course 7009 or Course 7018.

The 375/475 Field Communicator and ValveLink for Fieldbus will be demonstrated and available for students as optional activities.

Topics

- FOUNDATION™ fieldbus Overview
- Macro Cycle Execution
- Fieldbus Function Blocks
- Control Strategy Configuration
- Control Anywhere
- FieldVue Theory of Operation
- Transmitter Theory of Operation
- AMS Device Manager Methods
- Fieldbus Wiring Practices
- System Troubleshooting
- Configuring Fieldbus Device
- Alarms and PlantWeb Alerts
- Configuring a Fieldbus Operator Display
- Segment Checkout Procedures

Wireless Self Organizing Network

Course 2375 CEUs: 1.4

This course is intended for technicians, engineers and other plant personnel who need to know how to design, install, setup, configure, maintain and troubleshoot Wireless Self Organizing Networks and their components.

Overview

This 2-day course explains how Self Organizing Wireless Networks function and how they are installed, setup, configured and integrated. It emphasizes planning, proper installation and startup, configuration, maintenance, and integration. The course uses lectures and labs to maximize the hands on experience and teach the students. Students who complete this course will:

- correctly install and setup the 1420 Wireless Gateway
- properly install and configure Wireless Transmitters
- properly integrate Host interfaces to the Wireless Gateway

Prerequisites

Some experience in Networks and Host integration would be helpful.

Topics

- How Self Organizing Networks Function
- Self Organizing Networks Best Practices
- Network Components
- 1420 Installation and Setup
- Network Parameters
- Wireless Transmitters Installation, Configuration, Maintenance and Calibration
- THUM Installation, Wiring and Configuration
- Integrating and operating AMS Device Manager with the 1420 Wireless Gateway
- Operation of AMS Wireless Snap-On
- Modbus Serial Integration
- Modbus TCP Integration
- OPC Integration

FOUNDATION™ fieldbus FIELDVUE Digital Valve Controller

Course 7036 CEUs: 2.1

This 3-day course is designed to teach technicians and engineers the basics of FOUNDATION™ fieldbus digital valve controller installation, configuration, calibration, and troubleshooting using 375/475 Handheld, ValveLink™ software and DeltaV, and AMS Intelligent Device Manager.

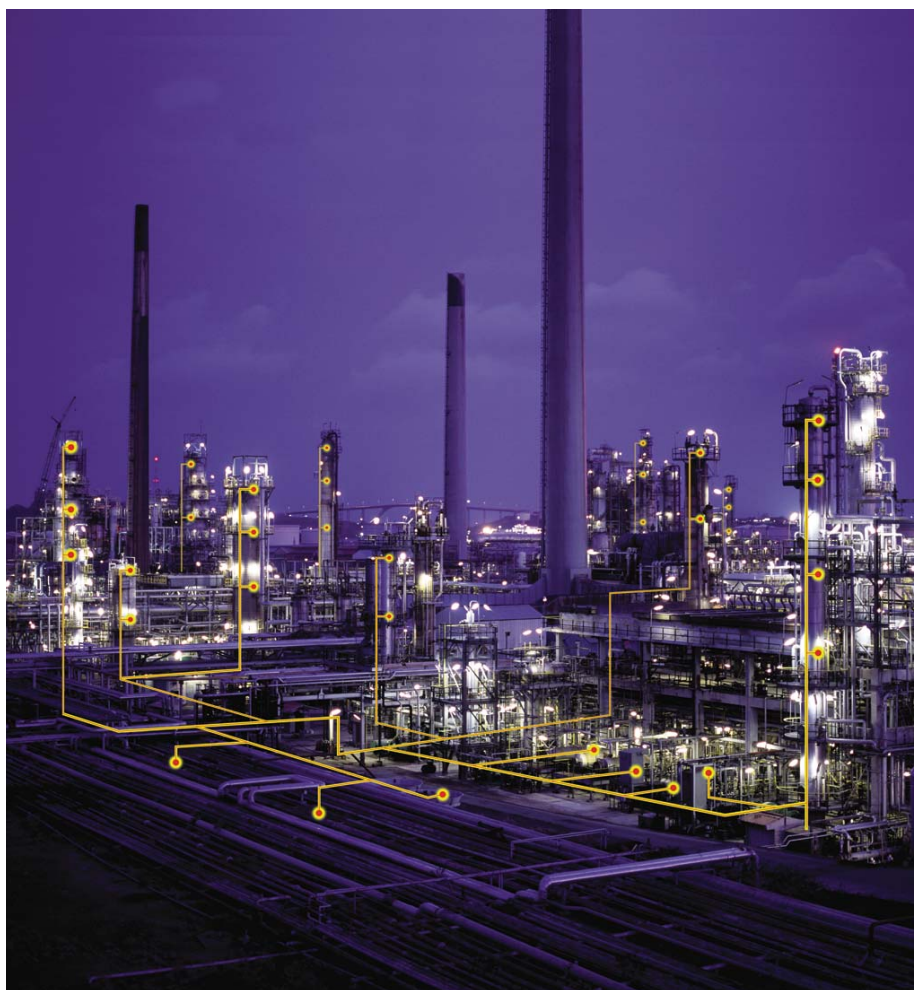
Overview

The course begins with a review of the role and function of control valve positioners and proceeds through a series of hands-on exercises that require the student to disassemble, inspect, assemble, install, and commission a fieldbus digital valve controller. During commissioning, students will learn the basics of the FOUNDATION™ fieldbus protocol, the role of function blocks, addressing, modes and status. Students will configure, calibrate, and commission devices using both 375/475 Handheld, ValveLink™ software and DeltaV. Hands-on exercises also teach students how to perform detailed setup routines and how to run and collect data for various ValveLink™ diagnostics. The class ends with a troubleshooting session that presents common problems and their solutions.

Prerequisites None, though a basic familiarity with positioners - preferably digital valve controllers - and control valve basics will be most useful.

Topics

- Positioner Basics
- FOUNDATION™ fieldbus Overview
- Digital Valve Controller Installation and Mounting
- Modes and Status
- Configuration/Calibration with DeltaV™
- Configuration and Calibration with the 375/475 Field Communicator
- Intro. to AMS ValveLink Fieldbus Functionality
- ValveLink™ Setup Wizard/Detailed Setup
- Tuning
- Tag Management
- Pressure Control
- ValveLink™ Diagnostics
- FIELDVUE Instrument Troubleshooting
- (Optional) Configuration/Calibration with NI Tools



To enroll in Plant Optimization courses please call 800-338-8158 or 641-754-3771. For additional contact information refer to the appropriate contact on page 109. Updated dates & locations are available on our website at www.emersonprocess.com/education.

Process Control

Persons completing these courses receive a good grounding in process control principles and strategies, controller tuning, and loop dynamics as they relate to Fisher control valves. Engineers and technicians with little or no experience begin to build the fundamental knowledge they need to move forward in this field.

Introduction to Process Control

Course 9000 CEUs: 3.2

This Fisher course is for managers, engineers, technicians and others that have little or no process experience. Those in support areas will benefit from this course. A good course for those interested in advancing in the fluid processing industry, and those preparing for ISA or other certification examinations.

Overview

This 4-1/2 day course provides those new to the field with the basic, overall fluid process controls knowledge they need to better understand the interrelationships associated with automated control loops. All major aspects of process control (meas. devices, controllers, final control elements, and fundamental control methods) are covered by classroom presentations and laboratory exercises that are intended to familiarize students with the function and application of the wide variety of equipment commonly found in process plants. The end goal of the course is to raise the levels of skill and confidence of persons with limited experience in process plants.

Prerequisites Some experience with process measurement and control may be helpful, but is not required. This is an introductory course.

Topics

- Process Control Terminology and Symbols
- Process Loop Introduction
- Measurement Instrumentation for:
 - Flow;- Level;- Temp;
 - Pressure
- Instrument Calibration Concepts
- Final Control Elements
 - Control Valves; - Actuators;
 - Control Valve Instrumentation
- Introduction to Loop Dynamics, Tuning and Control
 - Proportional Control; - Integral Control
 - Derivative Control; - Ziegler-Nichols Tuning; - Lambda Tuning

Loop Tuning Short Course

Course 9006 CEUs: 1.4

Overview

This 2-day Fisher course is designed for those engineers and technicians who have the job responsibility to tune controllers. The procedures that the students will learn and practice will enable them to tune controllers to meet the needs of each loop.

The **first** day will cover tuning methods that do not require calculations. The baseline method requires knowledge of the type of process, and the trial and error method requires making small setpoint bumps and changing controller gain and reset to meet the desired loop performance.

The **second** day will consist of open loop response testing and Lambda tuning to obtain greater loop accuracy, stability, and predictability.

Besides having lecture time, the students will practice tuning on process simulation software.

Topics

- Load Upsets
- Process Noise
- Self Regulating Process
- Integrating Process (Level)
- Valve Deadband and Stick/Slip
- Limit Cycling
- Baseline Controller Tuning
- Trial and Error Tuning
- Lambda Tuning
- Process Time Constant, Deadtime, and Gain
- Positioner Application Guidelines

Control Loop Foundation

Course 9025 CEUs: 3.2

This course is for engineers, managers, technicians, and others that are new to process control. This course includes the practical aspects of control design and process applications that course developers personally learned through years of hands on experience while designing and commissioning process control applications.

Overview

This 4-1/2 day course for personnel new to automation and covers process control fundamentals as well as the practical aspects of control system design and applications. Upon completion of this course the student will be able to effectively work with and commission single and multi-loop control strategies. Interactive workshops allow the student to apply what they learn in the class

Prerequisites Windows experience.

Topics

- Background – Historic Perspective
- Measurements – Basic Transmitter Types, Limitations
- Analyzers – Examples of On-Line Analyzers
- Final Elements - Valves and Variable Speed Drives
- Field Wiring and Communications – Traditional, HART, Foundation fieldbus, WirelessHART
- Control Strategy Documentation – Plot Plan, Flow Sheet, P&ID, Loop Sheet
- Operator Graphics and Metrics – Considerations in Display Design
- Process Characterization – Identifying Process Dynamics and Gain
- Control Objectives
- Single Loop Control – Basis for PID, Guideline in Selecting PID Structure, Action
- Tuning and Loop Performance - Manual and Automated Tuning Techniques
- Multi-loop Control – Feedforward, Cascade, Override, Split-range, Valve Position Control
- Model Predictive Control – Addressing Difficult Dynamics, Interactive Processes
- Process Modeling – Development of Process Simulation for Control System Checkout
- Application Examples – Batch, Continuous, Combustion, Distillation, Unit Coordination

Process Control

All these courses deal with optimizing process performance and reliability by reducing process variability through better control. Loop tuning-by-feel is replaced by a systematic, scientifically sound approach, which is the subject of several courses for process control engineers and technicians. These courses provide an excellent platform for further economic optimization via advanced process control.

Process Systems and Solutions LEARNINGPATH

To enroll in Process Control courses or for more information, please call:

800-338-8158 or 641-754-3771

Applied Modern Loop
Tuning
9032

Applied Advanced
Regulatory Controls
9034

Process Dynamics and
Tuning Fundamentals
(PCE I)
9030

Process Analysis and
Minimizing Variability
(PCE II)
9031

EnTech Toolkit
Training
1430

Process Control, Measurement & Automation Systems - Video Package Training is Also Available.
Visit Our Website:
www.emersonprocess.com/education

Applied Modern Loop Tuning

Course 9032 CEUs: 2.1

This course is for engineers and technicians responsible for maintaining process control performance using instrumentation and control loop tuning

Overview

Applied Modern Loop Tuning (9032) is a 3-day registration or on-site course that introduces participants to effective methods for determining optimal tuning parameters for regulation of processes. The non-oscillatory EnTech tuning techniques, based on Lambda tuning concepts, are taught with a focus on minimizing process variability. Effectiveness is gained by the implementation of a tuning strategy that matches control loop dynamics to process operating requirements. It contains formal lectures that are amply populated with process examples and supported with hands-on lab exercises using computer-based process simulators. Participants learn how to recognize acceptable versus unacceptable control loop performance and to identify the most common source of problems. Fundamental tuning concepts, including the PID controller, process dynamics, valve motion characteristics deadband (backlash) and resolution (stiction), setpoint tracking and regulatory control, integrating processes, and level control are reviewed and demonstrated using case study examples

Prerequisites Some experience with process instrumentation and control is helpful.

Topics

- Process Dynamics –perform bump tests to identify process model (gain, deadtime, time constant and valve dynamics) to determine PID tuning.
- Self Regulating loops – apply Lambda tuning to first-order and second-order process loops (flow, pressure, temperature, pH, etc)
- Integrating loops – tune levels and header pressures for load recovery and setpoint response
- Process Interactions – Lambda tune loops to minimize interactions and increase production

Applied Advanced Regulatory Controls

Course 9034 CEUs: 2.1

This course is for engineers and technicians responsible for process control design, implementation, and control performance.

Overview

This is a 3-day course that teaches the practical principals of advanced regulatory controls and tuning techniques to achieve improvements that can exceed that of basic PID controls. The course will examine many advanced regulatory control technologies commonly available today and help participants understand which technologies are best suited and how to appropriately apply them given specific process dynamics and conditions. Formal lectures are amply populated with process examples and supported with hands-on lab exercises. Approximately 40% of the course is hands-on lab based workshops where students develop practical skills required to apply and tune advanced regulatory controls. A dynamic process simulator is used to simulate a variety of process unit dynamics and evaluate the benefits of different advanced regulatory control strategies.

Prerequisites Participants should possess basic process control knowledge and experience with DCS control strategy configuration.

Topics

- Process and Disturbance Dynamics
- PID Algorithms – PID, PI, PI-D, I-PD, PD, P-D, ID, I-D, 2 degrees of Freedom Control
- Cascade Control, Dynamic Feedforward
- Ratio Control, Override(selector) Control
- Split Range and Midrange Control
- Interactive Control Loops – Decoupling Control (2X2) and Lambda Tuning
- Deadtime Compensation (Smith Predictor)
- Adaptive Control (Gain Scheduling, Auto Tuning)
- Introduction to Model Predictive Control (Multiple Inputs Single Output)

To enroll in Process Control courses please call 800-338-8158 or 641-754-3771.
For additional contact information refer to the appropriate contact on page 109. Updated dates & locations are available on our website at www.emersonprocess.com/education.



EnTech Applied Modern Loop Tuning and Advanced Regulatory Controls

Course 9035 CEUs: 3.2

This course is for engineers and technicians responsible for process control design, implementation, and control performance.

Overview

This is a special combined 9032 and 9034 4 1/2-day course that teaches the practical principals of advanced regulatory controls and tuning techniques to achieve improvements that can exceed that of basic PID controls.

The course will examine many advanced regulatory control technologies commonly available today and help participants understand which technologies are best suited and how to appropriately apply them given specific process dynamics and conditions.

Formal lectures are amply populated with process examples and supported with hands-on lab exercises. Approximately 40% of the course is hands-on lab based workshops where students develop practical skills required to apply and tune advanced regulatory controls. A dynamic process simulator is used to simulate a variety of process unit dynamics and evaluate the benefits of different advanced regulatory control strategies.

Prerequisites Participants should possess basic process control knowledge and experience with DCS control strategy configuration.

Topics

- Lambda Tuning for Self Regulating and Integrating processes
- Process and Disturbance Dynamics
- PID Algorithms – PID, PI, PI-D, I-PD, PD, P-D, ID, I-D, 2 degrees of freedom control
- Cascade Control, Dynamic Feedforward
- Ratio Control, Override(selector) Control
- Split Range and Midrange Control
- Interactive Control Loops – Decoupling Control (2X2) and Lambda Tuning
- Deadtime Compensation (Smith Predictor)
- Adaptive Control (Gain Scheduling, Auto Tuning)
- Introduction to Model Predictive Control (Multiple Inputs Single Output)

Process Dynamics and Tuning Fundamentals (PCE I)

Course 9030 CEUs: 2.8

This course is for engineers, or persons with equivalent math and theoretical background, who have responsibility for process control design and implementation, process optimization, or process design and troubleshooting.

Overview

Process Dynamics, Control and Tuning Fundamentals (Process Control for Engineers I) is a 4-day course that provides the fundamental theory governing process dynamic behavior, control system operation and controller tuning. Course material is based on experience gained in process variability optimization work and is based on modern control engineering concepts coupled with practical process application knowledge. This course presents a systematic approach to optimizing the control of a process unit operation in order to manufacture uniform product more efficiently. The course uses formal lectures with hands-on lab exercises. High fidelity process simulators are used as the basis for the labs and simulation analysis.

Prerequisites

An engineering degree or equivalent knowledge and functionality in the mathematics required to understand the concepts listed in "topics".

Topics

- Process Dynamics - Self Regulating and Integrating
- First Order Process Model
- Second Order Process Model
- Integrating Process Model
- Process & Control Nonlinearity
- Feedback Control & PID Controllers
- QAD Tuning & Lambda Tuning
- Setpoint & Load Response
- Frequency Response - Bode Plots
- Tuning Interactive Control Loops
- Coordinated Lambda Tuning for Unit Optimization

Process Analysis and Minimizing Variability (PCE II)

Course 9031 CEUs: 2.8

This course is for engineers, or persons with equivalent math and theoretical background, who have responsibility for process control design and implementation, process optimization, instrumentation engineering, or process design and troubleshooting.

Overview

PCE II is a 4-day course that provides a knowledge of the techniques used to troubleshoot process and control problems, improve performance and reduce variability in processes. Time series analysis, including power spectrum and autocorrelation function, are presented as tools for process and control auditing. The course uses formal lectures that are highlighted with an ample repertoire of process examples and hands-on lab exercises. High fidelity process simulators are used as the basis for the labs and situation analysis.

Prerequisites

Participants should have taken 9030 Process Dynamics, Control and Tuning Fundamentals (Process Control for Engineers I) or have similar knowledge. The simulators used in the course are similar to those used in Process Control for Engineers I.

Topics

- Review - Topics Presented in PCE I
- Use of Software for Identification of Process Dynamics, Lambda Tuning, Time Series Analysis
- Controller Tuning Troubleshooting - Dynamic Loop Interaction Problems
- Digital Control - Digital Controllers and Digital Sensors
- Signal Quantization, Signal Aliasing and Signal Filtering
- Time Series Analysis
- Power Spectrum
- Auto/Cross Correlation Function
- Interpreting Plant Process Data
- Process and Control Auditing Techniques
- Control Loop Evaluation- Power Spectrum
- Integrated Process and Control Design
- Advanced Process Control
- Mini-Audit Exercise

EnTech Toolkit Training

Course 1430 CEUs: 2.1

This course is for engineers, technicians or other persons who have responsibility for using the EnTech Toolkit as part of their role in process troubleshooting, minimizing variability, and improving or maintaining performance of operations.

Overview

This is a 3-day course that fully explores the various functions, options and capabilities that are built into the EnTech Toolkit software. The course starts with the data acquisition features of the Collect module as it is connected to field instrumentation or directly to digital systems. The power of the Analyse time series analysis software for process trouble-shooting, auditing and reporting on performance is examined using process simulators. The Tuner module includes bump test analysis, calculation of controller tuning parameters, and simulation of controller response characteristics. Participants are asked to perform process audits and report on their findings and the improvements they make.

Prerequisites

Participants should have taken Modern Loop Tuning (9032) or Process Control for Engineers I (9030), or possess similar process control knowledge, or they should have already been exposed to the EnTech Toolkit software.

Topics

- Signal Conditioning Module
- Collect Software, Collect DDE/OPC Software
- Collect Tag Database
- Tuner Identification Software
- Process Dynamic Types
- Tuner Tuning Software
- Tuner Simulation and Analysis Software
- Analyse Software
- Time Series Analysis
- Analyse Plot Interpretation/Manipulation
- Process Audit Methodology
- Mini-Audit of a Simulated Process
- Data Manager Software



To enroll in Process Control courses please call 800-338-8158 or 641-754-3771. For additional contact information refer to the appropriate contact on page 109. Updated dates & locations are available on our website at www.emersonprocess.com/education.

Refining Process Training

The subject of petroleum refining is a complex and demanding one. For over 25 years, the professionals at Refining Process Services have been providing refining company and industry supplier personnel with thorough and up-to-date technical programs covering all major aspects of refining crude oil.

Training Programs

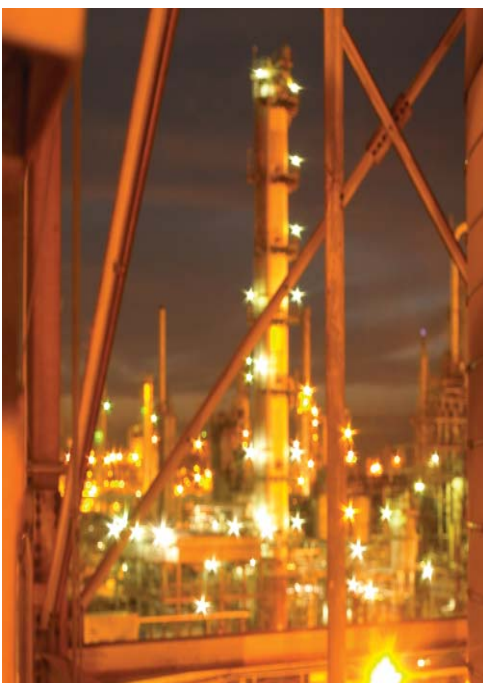
Basic one-day and more advanced two and three-day programs provide an overview of the modern petroleum refinery and the refining process. Advanced two and three day programs are offered in the core refining processes including atmospheric and vacuum crude oil distillation, hydrotreating, catalytic reforming, FCC, hydrocracking, delayed coking, amine treating and sulfur recovery, and gasoline/diesel blending.

In addition to the courses listed here, we offer a number of other courses including:

- Refinery Economics and Margin Improvement
- Energy Efficiency in Refineries
- Crude Oil Desalting
- FCC Unit Troubleshooting
- Water Treatment for Refineries
- Refinery Troubleshooting

The wide array of technical training programs offered by Refining Process Services provides many opportunities for industry engineers and supplier representatives to enhance their knowledge and improve their job performance. The instructors for these programs are among the most knowledgeable in their fields, providing the best possible learning experience.

More information describing Refining Process Services and all of the courses offered can be obtained by visiting the company website at: www.petroleumrefining.com.



Basics of Petroleum Refining for Non-Technical Personnel

Course RPS100

Overview

This program provides a 1-day overview of the petroleum refinery and the crude oil refining process. The course content was developed for class participants who have no formal training in chemistry or engineering. The program is designed for anyone with an interest in the refining industry and is perfect for those in non-technical assignments at petroleum refineries, corporate offices and supplier companies.

Topics

- Crude Oil Characteristics; Petroleum Fundamentals; Crude Oil Distillation; Refinery Flow Scheme; Product Blending and Usage; Gasoline Production; Refinery Process Basics; Basic Refining Economics

Fluid Catalytic Cracking Process Technology

Course RPS200

Overview

This program provides an intensive 3-day practical study of the modern fluid catalytic cracking (FCC) process. For many refiners, FCC represents the foundation of refinery gasoline production. Class participants will have the opportunity to obtain a broad working knowledge of the FCC process from recognized industry experts, to keep abreast of constantly evolving FCC technology and to interact with others currently working in this field. The program is for refinery engineers and operations staff and supplier company personnel providing FCC products and services.

Topics

- Feed & Process Basics; FCC Catalysts & Chemistry; Unit Mass & Heat Balance; Fluidization Fundamentals; Process Variable Interactions; FCCU Unit Equipment; Recovery of Cracked Products; Cracking Heavy Oils; Trends in FCC

Introduction to Petroleum Refining Processing

Course RPS110

Overview

This program provides an extensive 2 and 1/2-day study of the petroleum refinery and the crude oil refining processes. The course focuses on exploring the core petroleum refining processes in great depth; an understanding of crude oil; refined products and industry economics. It is for those who have formal training in chemistry or engineering, or who have hands-on work experience in refineries and is appropriate for technical/operations staff working in refineries or supplier industry personnel providing products and services.

Topics

- Petroleum Refinery Configuration; Crude Oil Distillation; Refined Products/Clean Fuels; Hydrotreating/Hydrocracking; Isomerization/Catalytic Reforming; Fluid Catalytic Cracking/Alkylation; Gas Plants/Sulfur Recovery; Delayed Coking/Deasphalting; Petroleum Economics

Hydrotreating and Hydrocracking Process Technology

Course RPS300

Overview

This is an extensive 2 and 1/2-day study of the catalytic processes that use hydrogen to upgrade the quality of petroleum fractions. Content focuses on exploring the core refining processes of hydrotreating, hydrocracking and hydrogen production. It is for those in chemistry/engineering or who have hands-on work in refineries.

Topics

- Chemistry of Hydroprocessing; Sulfur and Nitrogen Removal; Naphtha Pretreating; Feedstock and Process Variable Effects; Distillate and Gas Oil Hydrotreating; Diesel & Jet Fuel Production; Commercial Hydrocracking; Troubleshooting Hydroprocessing Units; Equipment & Design Principles; Hydrogen Production

Catalytic Reforming Process Technology

Course RPS400

Overview

This program provides an intensive 2 and 1/2-day practical study of the catalytic reforming process. This process is employed to upgrade the octane characteristics of raw gasoline called naphtha that is distilled from crude oil. Participants will have the opportunity to obtain a broad working knowledge of the naphtha reforming process from recognized industry experts and to learn about monitoring and optimization of commercial units.

Topics

- Process Configurations; Chemistry of Reforming; Reforming Catalysts; Process Variables Interactions; Naphtha Hydrotreating; Commercial Reformer Monitoring; Continuous Catalyst Regeneration; Reformer Operating Schemes; Troubleshooting Commercial Units

Crude Oil Distillation

Course RPS500

Overview

This program provides an extensive 3-day study of the distillation of crude oil in a petroleum refinery. The atmospheric and vacuum pipe stills are used to separate crude into the desired fractions so that appropriate feedstocks will be available for the downstream process units. The course content is designed for class participants who have formal training in engineering or who have hands-on work experience in refineries. The program is appropriate for technical and operations staff working in refineries or supplier industry personnel providing products and services to refiners.

Topics

- Crude Unit Design; Crude Oil Characteristics; Process Flow Schemes; Impact of Crude Oil Type; Pre-Flash Column; Atmospheric Column; Vacuum Column & Ejector System; Crude Unit Monitoring & Troubleshooting; Revamp & Debottlenecking

Delayed Coking Process Technology

Course RPS600

Overview

This program provides an intensive 3-day practical study of the delayed coking process. This process is employed to upgrade the highest boiling fraction of crude oil called vacuum tower bottoms or resid. Participants will have the opportunity to obtain an in-depth working knowledge of the delayed coking process from a noted industry expert and to learn about operation and optimization of a commercial delayed coker. It is for refinery engineers/operations staff/supplier personnel providing technical support to refineries.

Topics

- Coking Process Fundamentals; Coker Feed Systems; Feed Preheat Furnace; Coke Drum Operations; Coker Process Variable Effects; Petroleum Coke Quality; Decoking Operations; Coker Fractionator and Gas Plant; Unit Monitoring and Troubleshooting; Trends in Delayed Coking

Amine Treating and Sulfur Recovery Technologies

Course RPS120

Overview

This program provides an extensive 2 and 1/2-day study of the refinery processing operations used to remove hydrogen sulfide from refinery gas streams and convert it to elemental sulfur. Content focuses on exploring the refinery processes of amine treating, sour water stripping, Claus units, and tail gas treatment. It is for those who have formal training in chemistry or engineering or who have hands-on work experience in refineries. It is for technical and operations staff working in refineries or supplier industry personnel providing products and services to refiners.

Topics

- Hydrogen Sulfide- Refineries; Fundamentals of Sulfur Chemistry; Amine Treating Units; Sour Water Treating; Claus Sulfur Recovery Units; Sulfur Recovery, Loading & Forming; Process Monitoring and Procedures; Tail Gas Treating Processes.

Gasoline/Diesel Blending for Refiners and Traders

Course RPS800

Overview

This program provides a 3-day discussion of the technology and techniques available to efficiently blend fuels to meet product specifications while minimizing product quality giveaway. Content includes discussion of blend planning, blend orders, quality control, optimization, field equipment, blending software, current and future fuel specifications, and environmental considerations. It is for personnel involved in the petroleum refining, petrochemical, and automotive industries, and those from instrumentation, automation and product marketing companies, product trading groups, and government agencies.

Topics

- Types of Blending; Specifications, Components & Additives; Equipment & Software; Demos of Blending Tools; Operation Cycle; Quality Assurance; Clean Fuels & Environmental Issues; Benefits of In-Line Blending

To enroll in Refining Process Training courses call 412-826-5440 or email: seminars@petroleumrefining.com. For additional contact information refer to the appropriate contact on page 109. Updated dates & locations are available on our website at www.emersonprocess.com/education.

Machinery Health™ Management

Companies today rely on fewer people to do more work. That's why the need for training is more critical than ever to achieve and maintain cost-effective maintenance programs. Emerson helps maximize the return on your investment in technology and people. Every year, more than 1500 individuals receive training from Machinery Health Management classes around the world. Our instructors share their own real-world experiences and guide classes through hands-on exercises that reinforce the lesson. Emerson's Machinery Health Management strategy includes training courses designed to help you start-up and maintain your mechanical equipment. Our goal is to provide you with the knowledge to keep your plant running smoothly.

Paths to Success

Emerson Training is a proven means for acquiring confidence and experience in the technologies associated with industrial maintenance. Our alumni are considered valuable assets to their organizations, and can tell of the recognition and job promotions they've received from plant management. Attending Emerson Training is an investment in your career and the efficient and competitive operation of your facility. More than simply a catalog of courses, Emerson Training is an educational path that leads to full mastery of the knowledge and skills necessary in a Machinery Health program. These "Paths to Success" are outlined for you here. They include both theory and application classes that are required for certification as well as product-specific classes for getting the most out of your existing hardware/software tools. These same hands-on, application-intensive courses offered in our own classroom environment can also be taught in your facility. For a calendar schedule of courses along with course descriptions and registration information, go to: www.assetweb.com/mhm.

Category I Vibration Analyst Path to Success

- Fundamentals of Vibration Analysis
- Fundamentals of CSI 2130 Machinery Health Analyzer
- Introduction to AMS Machinery Manager
- Basic Vibration Analysis
- Category I Vibration Analyst Certification Exam

Category II Vibration Analyst Path to Success

- Intermediate AMS Machinery Manager
- CSI 2130 Advanced Function with PeakVue™
- Intermediate Vibration Analysis
- Category II Vibration Analyst Certification Exam

Category III Vibration Analyst Path to Success

- Advanced AMS Machinery Manager
- PeakVue™ Mystery and Autocorrelation
- Advanced Vibration Analysis
- Category III Vibration Analyst Certification Exam

Online Monitoring Path to Success

- On-line Prediction (CSI 4500/6500/XP32) Operation and Maintenance
- On-line Protection (CSI 6000/6500) Operation and Maintenance
- Turbo Machinery Diagnostic

Lubrication Analyst Path to Success

- Lubrication Level 1 & 2 with Certification exam
- Wear Debris Analysis Workshop
- OilView® for AMS Machinery Manager

Reliability Management Path to Success

- Root Cause Failure Analysis

Adding other Technologies to your Credentials

- Laser Alignment
- Balancing Theory & Application
- Basic Ultrasonic Theory & Technology & Level 1 Certification Exam
- Electric Motor Diagnostics & Basic MotorView
- IR Thermography & Level 1 Certification Exam

Fundamentals of Vibration

Course 2069 CEUs: 1.4

Overview

This 2-day vibration training course is for those with no prior experience in vibration analysis. The class prepares participants for the Basic Vibration Analysis Course. Students learn about causes of vibration and methods of measurement. Although the training course does not provide instruction on Emerson's CSI technologies, the class will use them to demonstrate vibration principles.

Prerequisites None

Topics

- Introduction to Vibration
- Components of a Predictive Maintenance Program
- Basic Fault Identification
- Vibratory Fault Characteristics and Patterns
- Information to Help Jump Start a Vibration Program

Fundamentals of Vibration eLearning

Course e2069 NEW CEUs: 0.2 3 Months Unlimited Access



This e-course provides instruction to individuals with no prior experience in vibration analysis. The course introduces the technology of vibration analysis by explaining what vibration analysis is and how it plays a critical role in any predictive maintenance program. Students are led through a self-paced discussion on how vibration analysis works with many examples of the types of faults that can be detected. Students will also gain an understanding of where and how vibration is measured with an emphasis on good data collection techniques. Students will learn important terminology that will be critical to their success as they progress to the next level of training in vibration analysis; Emerson's Basic Vibration Analysis course.

Topics to be covered include:

- Chapter 1: Fundamentals of Vibration
- Chapter 2: How is Vibration Measured?
- Chapter 3: Understanding the Vibration Signal
- Chapter 4: Vibration Units
- Chapter 5: Analysis Parameters
- Chapter 6: Data Analysis: Where to begin?

Note: Typical duration of course access is 3 months. Contact education@emerson.com to request an extension.

Basic Vibration Analysis/Category I Compliant

Course 2031 CEUs: 2.8

Overview

This course complies with Category I Vibration Analyst per ISO standard 18436-2: Vibration condition monitoring and diagnostics. This course is intended to enable students to operate single channel machinery analyzers, dump and load routes, recognize the difference between good and bad data, and compare vibration measurements against pre-established alert settings. Although this training course is not product specific, students will use Emerson's CSI technologies for demonstration purposes. The class shows the student how to use the vibration analyzer in conjunction with Emerson Machinery Health Management supported software to analyze basic vibration defects.

Prerequisites

Fundamentals of vibration or up to six months of vibration experience is recommended.

Topics

- Principles of Vibration
- Data acquisition & Signal Processing
- Condition monitoring & Corrective Action
- Equipment Knowledge
- Acceptance Testing
- Basic Analyzer Functions
- The Class Shows Students How to Recognize Machine Defects such as:
 - Unbalance
 - Shaft Misalignment
 - Looseness
 - Rolling Element Bearing Defects
 - Gear Problems
 - Resonance Introduction to Electrical Defects
 - Introduction to Electrical Defects

Participants will receive a complimentary copy of the Pocket Vibration Analysis Trouble-Shooter Guide.

Intermediate Vibration Analysis/Category II Compliant

Course 2032 CEUs: 2.8

Overview

This course complies with Category II Vibration Analyst per ISO standard 18436-2: Vibration condition monitoring and diagnostics. Category II vibration analysts are expected to be able to select appropriate vibration measurement techniques, set up instruments for basic resolution of amplitude, frequency, and time, perform basic spectrum analysis, maintain a database of results and trends, perform single-channel impact tests, classify, interpret, and evaluate test results in accordance with applicable specifications and standards, recommend minor corrective actions, and understand basic single plane field balancing concepts.

This course also features the use of the CSI 2130 Machinery Analyzer in conjunction with advanced machinery analysis techniques. Discussions of case histories on machinery faults are one of the focal points of this course

Prerequisites

Basic Vibration Analysis course and a cumulative 18 months of field experience are recommended.

Topics

- Equipment Testing and Diagnostics
- Reference Standards
- Reporting and Documentation
- Fault Severity Determination
- Analyzer Averaging Techniques
- Sensor Selection Guidelines
- Introduction to Demodulation and PeakVue®
- Advanced Waveform Analysis
- Sideband Analysis
- Rolling Element Bearing Failure Modes
- Advanced Electrical Analysis Techniques
- Pump/fan Vibration
- Phase Analysis using Single and Dual Channel
- Perform Basic Single-Plane Field Balancing

Students will receive a complimentary copy of the Simplified Handbook of Vibration Analysis, Volume I, by Art Crawford.

Advanced Vibration Analysis/Category III Compliant

Course 2033 CEUs: 2.8

Overview This course complies with Category III Vibration Analyst per ISO standard 18436-2: Vibration condition monitoring and diagnostics. This course expands on the subjects covered in the Intermediate Vibration course (Category II), especially in the areas of fault analysis and corrective actions. The class details advanced analysis techniques. The dual channel machinery health analyzer features are introduced including the use of AMST™ Suite: Machinery Health Manager Software to set up the advanced analyzer features and the powerful downloadable programs for data collection. The transient machinery health analyzer capabilities are covered such as long-term time waveform. The class covers advanced resonance detection using a variety of testing methods, including triggered data collection.

Prerequisites Intermediate Vibration Analysis course and a cumulative three years of field experience are recommended.

Topics

- Specify Appropriate Vibration Instrumentation Hardware and Software for both Portable and Permanently Installed Systems
- Perform Spectrum and Time Waveform Analysis Under both Steady-State and Unsteady Operating Conditions
- Establish Specifications for Vibration Levels and Acceptance Criteria for New Machinery
- Measure and Analyze Basic Operational Deflection Shapes (ODS)
- Measure and Analyze PeakVue® Measurements
- Slow Speed Technology (SST®)
- Zoom Analysis / Transient Techniques
- Dual Channel Machinery Analyzer Features
- Triggered Data Capture/Resonance Detection

Students will receive a complimentary copy of the Simplified Handbook of Vibration Analysis, Volume I, by Art Crawford.

Electric Motor Diagnostics and MotorView®

Course 2081 CEUs: 2.8

The MotorView course is designed for students who are experienced in vibration analysis and diagnostics, and focuses on the theoretical concepts of motor diagnostics.

Overview

This 4-day course uses labs and case histories to demonstrate the functionality of the MotorView software in determining rotor bar defects using current and flux data. This course is designed for mechanical and electrical skilled personnel who may not have a background in motor theory, operation and construction.

Topics

- Basic electrical principles
- AC/DC motor theory and design
- Variable frequency drives
- Data collection methods
- Current spectra and waveform analysis
- Flux spectra analysis and data evaluation
- Temperature data
- Shaft current
- Analysis of case histories
- Windows configuration for MotorView Operation



To enroll in Machinery Health Management courses please call 800-675-4726 or 865-675-2400. For additional contact information refer to the appropriate contact on page 109. Updated dates & locations are available on our website at www.emersonprocess.com/education.

ISO Compliant Vibration Certification Exams

Course 2021EX

Overview

Category I exam, available at the end of course 2031. Test Format: Written exam
Duration: 2 hours Passing Grade: 75%

Eligibility for Examination:

- Recommended Minimum Duration of Cumulated Training (hours): 32
- Recommended Minimum Duration of Cumulated Experience (months): 6

Course 2022EX

Overview

Category II exam, available at the end of course 2032. Test Format: Written exam
Duration: 3 hours Passing Grade: 75%

Eligibility for Examination:

- Recommended Minimum Duration of Cumulated Training (hours): 70
- Recommended Minimum Duration of Cumulated Experience (months): 18
- Passing Category I exam is NOT a prerequisite for taking Category II exam.

Course 2023EX

Overview

Category III exam, available at the end of course 2033. Test Format: Written exam
Duration: 4 hours Passing Grade: 75%

Eligibility for Examination:

- Recommended Minimum Duration of Cumulated Training (hours): 110
- Recommended Minimum Duration of Cumulated Experience (months): 36
- Has taken and passed the Category II exam.

Fundamentals of CSI 2130 Machinery Health Analyzer

Course 2072 CEUs: 1.4

Overview

This 2-day hands-on course focuses on the basic operation of the CSI 2130 Machinery Health Analyzer. Students will collect data on lab machines. This course is designed for students with little or no experience with CSI analyzers, but who are experienced in the field of vibration data collection and analysis.

Note: You may take with Fundamentals of Vibration as a four day course.

Prerequisites Understanding of vibration analysis.

Topics

- Analyzer/Computer Communication
- Predefined Route Data Collection
- Off-Route Data Collection and Setup
- Monitor Mode Measurements
- Peak and Phase Measurements

eLearning Course Available

eLearning: Fundamentals of the CSI 2130 Machinery Health Analyzer

Course e2130 CEUs: .6 3 Months Unlimited Access



Emerson's Machinery Health Management training now includes a Fundamentals of the 2130 eLearning course, designed to provide you with the tools you need to perform data collection using the CSI 2130 Machinery Health Analyzer.

Overview

This course provides guided demonstrations through the processes of installing necessary drivers, uploading updated firmware, and loading updated or newly-purchased programs necessary for data collection. Learn how to load a pre-defined route into the CSI 2130, gather general data as well as specialized data, and then interface the data back with a computer for further diagnostic analysis.

Topics

- Analyzer-Computer Communication
- Predefined Route Data Collection
- Off-Route Data Collection and Setup
- Monitor Mode Measurements
- Peak and Phase Measurements

Online training puts the information in your hands at your convenience.

- Access the eLearning course anytime within three months after registration
- Available at your home, office, anywhere you can access the Internet

To Register

To register call 800-675-4726 or www.emersonprocess.com/education

Note: Typical duration of course access is 3 months. Contact education@emerson.com to request an extension.

Advanced CSI 2130 with PeakVue

Course 2091 CEUs: 2.1

Overview

This 3-day course is intended for students with single-channel vibration analysis experience and little or no multi-channel experience. This class covers advanced signal processing using Emerson's patented PeakVue technology for slow-speed analysis, transient capabilities, coherence and cross-channel phase, operating deflection shapes (ODS), modal analysis, and other advanced techniques.

Prerequisites

Single channel vibration analysis experience is required.

Topics

- PeakVue
- Resonance Detection
- Dual Channel Data Collection
- Fundamentals of Cross-Channel Data Collection
- Introduction to Coherence and Cross-Channel Phase
- Orbit Data Collection
- Introduction to Operating Deflection Shape (ODS) Testing Methods
- Introduction to Modal Analysis Testing Methods
- Advanced Two-Channel DLP
- Zoom Analysis, Cascade and Overall
- Transient Wave Form Capture and Analysis
- CSI 2130 Analysis Experts

PeakVue™ Mystery and Autocorrelation

Course 2035 CEUs: 2.1

This 3-day course provides insight into advanced functionality of Emerson's patented PeakVue™ technology and Autocorrelation. Machine vibrations generate both macro and microscopic vibrations, and microscopic vibrations generate stress waves that have frequency ranges determined by the mass of the impacting object. The properties of these stress waves will be explained.

Overview

The Autocorrelation section of the course will teach the power of the autocorrelation coefficient function for the analysis of vibration induced time wave form data. The autocorrelation function data generally are computed from the same time wave form data used to compute the spectrum. The strengths of the autocorrelation data are complimentary to the strengths of the spectral data. This course makes use of both case studies from real-life examples of common faults and live demonstrations illustrating specific mounting procedures to reliably detect certain faults. The difference between PeakVue techniques and demodulation will also be demonstrated.

Prerequisites Students should be familiar with vibration data collection and analysis techniques and the use of AMS Machinery Manager Software.

Topics

- Proper PeakVue™ Set-Ups for all Speeds (as Low as 1 rpm)
- Sensor Selection and Sensor Mounting
- Setting Alarm Levels
- Choosing Trend Parameters
- Analyzing PeakVue™ Spectra and Waveforms
- Uses of the Circular Waveform Plot
- Introduce the Autocorrelation Coefficient
- Demonstrate the Computation of the Autocorrelation Coefficient Data from the Time Wave form Data
- Highlight the Strengths of the Autocorrelation Coefficient Function Data/Spectra Data
- Demonstrate the use of the Autocorrelation Coefficient Data as a Diagnostic Tool to Support the Spectra Data for Vibration Analysis Through Several Case Studies
- Identify Unique Patterns of the Autocorrelation Function Data for Certain Classes of Bearing Faults, Gearing Faults, etc.

Introduction to Windows-Based ODS/Modal

Course 2039 CEUs: 2.8

Overview

This 4-day course is designed to teach Operating Deflection Shape (ODS) and Modal Analysis software. This course uses the CSI 2130 single- and dual-channel Machinery Health Analyzers to teach the practical concepts of ODS/modal measurement techniques and display options. The modal course is introductory and will not cover theory or mathematical background.

Prerequisites

Knowledge of dual-channel analyzers and at least one year of full-time vibration analysis experience is recommended.

Topics

- Building of the Wireframe Model
- Measurement Considerations
- Collecting ODS Data With and Without a Tachometer Reference
- Utilizing an Impact Hammer with the CSI 2130 Advanced Dual-Channel DLP
- Interpretation of Results

To enroll in Machinery Health Management courses please call 800-675-4726 or 865-675-2400. For additional contact information refer to the appropriate contact on page 109. Updated dates & locations are available on our website at www.emersonprocess.com/education.

Introduction to AMS™ Suite: Machinery Health Manager

Course 2068 CEUs: 2.8

Overview

This 4-day course was designed for the new users of AMS Machinery Manager. Students learn methods of database creation and vital features of route creation such as collecting reference data, analyzer/computer communication, and the basic concepts of Analysis Parameter Sets, Alarm Limit Sets, and Fault Frequency Sets. A CSI 2130 Analyzer will be used to load routes and collect data on lab machinery for basic vibration analysis using Export and Diagnostic Plotting.

Prerequisites

Computer experience with the Windows operating system and Basic Vibration are recommended.

Topics

- Navigation
- Database Creation
- Data Collection
- Basic Analysis and Reporting
- Link to RBMview®

This course is based on the current mass release of the AMS Machinery Manager software. Students can call to verify if the course is appropriate to the version they are using. Advanced Vibration Analysis Module, Infrared Analysis, Motorview, CSI On-Line Machinery Health Monitor and Oilview modules are covered in other course offerings and are not part of this course.

Intermediate AMS™ Suite: Machinery Health Manager

Course 2074 CEUs: 2.8

Overview

This 4-day course was designed for students who have a basic understanding of AMS Machinery Manager. Students expand their knowledge of machinery analysis techniques, focusing on analysis and reporting using PlotData, Diagnostic Analysis, Export, PeakVue and the full version of RBMview®.

Prerequisites

Introduction to AMS Machinery Health Manager Course

Topics

- Vibration Analysis Module
- Export
- PeaVue Technology
- RBMview
- PlotData

This course is based on the current mass release of the AMS Machinery Manager software. Students can call to verify if the course is appropriate to the version they are using. Infrared Analysis, Motorview, CSI On-Line Machinery Health Monitor and Oilview modules are covered in other course offerings and are not part of this course.

Advanced AMS™ Suite: Machinery Health Manager

Course 2070 CEUs: 2.8

Overview

This 4-day course is the third in our series of AMS Machinery Manager courses. Its focus is on the management, modification and optimization of the existing AMS Machinery Manager database. Students will learn how to modify existing Wizard configurations, add and edit users, statistically adjust alert and fault levels, make global database changes, and many other very useful database functions. This course is intended for the advanced user who has already created a machinery database and has been acquiring, storing and analyzing data for six months or more.

Prerequisites

Intermediate AMS Machinery Health Manager Course. Intermediate Vibration or one year vibration analysis experience. Experience with the Windows operating system is recommended.

Topics

- Advanced Analysis Features in Diagnostic Plots
- Problem Reporting
- Status-at-a-Glance Operation and Reporting
- Nspectr®
- Wizard - Reporting Techniques and Modification/Addition of Setup Information
- Austostat
- Database Utility
- Database Zip Utility
- Network Administration
- Data Locker Management

This course is based on the current mass release of the AMS Machinery Manager software. Students can call to verify if the course is appropriate to the version they are using. Infrared Analysis, Motorview, CSI On-Line Machinery Health Monitor and Oilview modules are covered in other course offerings and are not part of this course.

Vibration Analysis Module AMS Machinery Manager (V5.2 or Higher) eLearning

Course e2074V CEUs: 0.1
3 Months Unlimited Access



Overview

This e-course provides thorough introduction on the Vibration Analysis module in the V5.2 or higher AMS Machinery Manager software. The interface of the Vibration Analysis module is much more user intuitive. With the V5.2/V5.3 version of the Vibration Analysis module, powerful tools for the analysis and comparison of multiple types of data are right at your fingertips.

Prerequisites

Familiar with the AMS Machinery Manager Software

Topics

- Introduction of the New Vibration Analysis Module (V5.2/V5.3)
- Learn to Display Spectra, Waveform, and Trends
- Use the Toolbar for Data Manipulation

Note: Typical duration of course access is 3 months. Contact education@emerson.com to request an extension.

On-Line Protection (CSI 6000/6500) Operation and Maintenance

Course 2080 CEUs: 1.4

Overview

This 2-day course is a hands-on training for anyone involved with operating and maintaining a CSI 6000/6500 System. Workshops include practice with "live" monitors and racks.

Topics

- Overview of Hardware Components
- Rack Configuration
- Operator Display Software
- Data Acquisition Software
- Interface with the CSI On-line Prediction System
- System Troubleshooting and Maintenance

On-Line Prediction Operation and Maintenance

Course 2088 CEUs: 2.8

Overview

This 4-day course best suits those who have a CSI 4500, CSI 6500, CSI 2600 or XP32 system installed and operational prior to attending the course.

The course is designed for:

- system users or analysts
- personnel using the CSI 4500, CSI 6500, CSI 2600 or XP32 daily
- those responsible for configuring databases and analyzing data

Prerequisites

Knowledge of vibration and industrial machinery is helpful, but not necessary.

Topics

- Vibration Basics and Terminology Relating to the CSI 4500, CSI 6500, CSI 2600 or XP32
- System Overview: Functionality and System Components
- Online Watch - used to Monitor the System Daily
- Online Config - Adding a New Machine to an Existing Database
- Vibration Analysis Module - Spectrums, Waveforms and Trend Data
- PeakVue Processing
- Transient Setup and Capture Evaluation
- Review of Customer Databases

Practical Application of CSI On-Line Technologies

Course 2088A NEW CEUs: 2.8

Overview

This 4-day course explores the operation, use, and application of online monitoring and transient capture technologies using CSI's 4500, 6500, XP-32 and 2600 online products and AMS Suite: Machinery Health Monitoring Software.

This course is intended for:

- anyone interested in online monitoring and transient capture
- reliability managers
- vibration analysts and technicians responsible for reliability services

Prerequisites

Knowledge of vibration and industrial machinery is helpful, but not necessary.

Topics

- On-line Monitoring Database Configuration including Gross Scan and Spectral Scan
- Database Construction of Sleeve Bearing Configuration including Shaft Centerline Plots and Orbits
- Sensor Configurations for Various Sensor Types including: Accelerometer, Velocity, Proximity Probe, Microphone, Pressure, Laser Displacement, Temperature and other Sensors
- Practical Application of Input and Output Relays
- Troubleshooting Tools (Putty or Telnet)
- Constructing Analysis Parameter Sets for Normal Vibration, High Frequency Vibration, PeakVue and Process Signals
- Time and Predicate Based Data Collection Sets
- On-line Watch Program Operation
- Transient Capture Database Configurations
- Transient Auto Archive Creation
- Transient Data Extraction
- On-line and Transient Capture Case Histories
- Analyzing On-line and Transient Data using the Vibration Analysis Program

To enroll in Machinery Health Management courses please call 800-675-4726 or 865-675-2400. For additional contact information refer to the appropriate contact on page 109. Updated dates & locations are available on our website at www.emersonprocess.com/education.

Turbo Machinery Diagnosis with the CSI On-Line System

Course 2089 CEUs: 2.8

Overview

This 4-day course details the operation, maintenance, management, diagnostics and design of rotating machinery using vibration information. Emphasis is placed on interpreting start-up/shutdown and steady state vibration data plots, understanding the sources of rotating machinery vibration and recognizing common machinery malfunctions. This seminar makes extensive use of full featured field diagnostic equipment to reinforce lecture topics.

This class is designed for engineers, supervisors, managers, and rotating equipment support professionals responsible for design, operation, and maintenance of rotating equipment

Students receive a copy of Fundamentals of Rotating Machinery Diagnostics, written by vibration monitoring pioneer and rotor dynamics researcher Donald E. Bently.

Wireless Self Organizing Network

Course 2375 CEUs: 1.4

This course is intended for technicians, engineers and other plant personnel who need to know how to design, install, setup, configure, maintain and troubleshoot Wireless Self Organizing Networks and their components.

Overview

This 2-day course explains how Self Organizing Wireless Networks function and how they are installed, setup, configured and integrated. It emphasizes planning, proper installation and startup, configuration, maintenance, and integration. The course uses lectures and labs to maximize the hands on experience and teach the students. Students who complete this course will:

- correctly install and setup the 1420 Wireless Gateway
- properly install and configure Wireless Transmitters
- properly integrate Host interfaces to the Wireless Gateway

Prerequisites

Some experience in Networks and Host integration would be helpful.

Topics

- How Self Organizing Networks Function
- Self Organizing Networks Best Practices
- Network Components
- 1420 Installation and Setup
- Network Parameters
- Wireless Transmitters Installation, Configuration, Maintenance and Calibration
- THUM Installation, Wiring and Configuration
- Integrating and operating AMS Device Manager with the 1420 Wireless Gateway
- Operation of AMS Wireless Snap-On
- Modbus Serial Integration
- Modbus TCP Integration
- OPC Integration



Level I Lubrication with Certification

Course 2082A CEUs: 1.05

Overview

This 1.5-day course is designed for individuals who have limited or no oil analysis experience. Guidelines and instruction for starting an oil analysis program will be provided. The course focuses on the basic properties of lubricants and lubricant specifications including additive packages. An overview of laboratory testing methods and interpretation of test data is taught. In addition, instruction is provided on proper storage and handling of new, unused lubricants, as well as sample point identification and best practices for collecting samples from machinery. Basic contamination control and wear debris analysis and identification is covered.

Prerequisites

None.

Topics

- Starting a Productive Lubricant Analysis Program
- Analyzing Oil Data
- Identifying Common Types of Wear Debris, their Origins, and Corrective Actions
- The Importance of Contamination Control
- Designing Sampling, Storage and Handling Procedures

Optional Level I Lubrication Certification is available at no charge

Note: May be taken with Level II Lubrication as a 3-day course.

Level II Lubrication with Certification

Course 2082B CEUs: 1.05

Overview

The focus of this 1.5-day course is the use of oil analysis with other predictive technologies to enhance your machinery health program. Machine life extension and reduction of unscheduled downtime will be covered in depth. Training includes introductions to lubricant engineering, failure concepts, and failure prevention. Information will be provided on greases and synthetic lubricants, including advantages and applications. Guidelines and step-by-step procedures will be offered for consolidating lubricants, setting alarm limits, as well as managing and enhancing existing lubrication programs.

Prerequisites

Basic understanding of lubrication.

Topics

- The Components of RBM Lubrication Program
- Methods for Extending Machine Life
- The Importance of Wear Debris Analysis and Contamination Control
- Lubricant Consolidation
- Establishing Alarms

Optional CSI Level II Lubrication Certification-no charge

Note: May be taken with Level I Lubrication as a 4-day course.

OilView® for AMS Machinery Manager

Course 2083 CEUs: 2.8

Overview

This 4-day course is designed for those who are new to CSI onsite oil analysis instruments and experienced users who wish to use advanced OilView features in AMS Machinery Manager. Students learn database creation and modification, creation and modification, Analysis Parameter and Alarm Limit Sets.

The course demonstrates how to set up and configure the OilView software module, discusses calibration and use of OilView instruments (including the CSI 5200 Trivector Analyzer) for analyzing oil samples onsite, and explains data interpretation and basic reporting.

Prerequisites

None.

Topics

- Introduction to Oil Analysis
- Onsite Analysis
- Reference Oil Database Management
- Database Construction and Modification
- Analysis Parameter Sets
- Alarm Limit Sets
- Best Practices for Onsite Analysis Using OilView
- Importing Laboratory Data
- Basic Wear Debris Analysis
- Data Analysis and Reporting



To enroll in Machinery Health Management courses please call 800-675-4726 or 865-675-2400. For additional contact information refer to the appropriate contact on page 109 Updated dates & locations are available on our website at www.emersonprocess.com/education.

OilView® for AMS Machinery Manager eLearning

Course e2083 CEUs: 1.4
3 Months Unlimited Access



Overview

This internet-based course is ideal for those who have never used Emerson's onsite oil analysis technologies as well as experienced users who wish to learn more about advanced OilView® features in AMS Suite: Machinery Health Manager. The course demonstrates how to set up and configure the OilView® software module, discusses calibration and use of OilView® instruments (including the CSI 5200 Machinery Health Oil Analyzer) for analyzing oil samples onsite, and explains data interpretation and basic reporting. Also covered is database creation and modification, Analysis Parameter and Alarm Limit Sets.

Topics

- Reference Oil Database Management
- Database Construction and Modification
- Analysis Parameter Sets
- Alarm Limit Sets
- Best Practices for Onsite Analysis Using OilView®
- Importing Laboratory Data
- Basic Wear Debris Analysis
- Data Analysis and Reporting

Note: Typical duration of course access is 3 months. Contact education@emerson.com to request an extension.

Wear Debris Analysis

Course 2084 CEUs: 1.4

Overview

Wear debris analysis (WDA) is often referred to as the most important form of oil analysis. This course teaches how to apply environmental conditions and other outside factors to make an accurate root cause analysis. Attendees will gain a basic understanding of wear particle generation, sample preparation techniques and identification of wear particles.

Topics

- Theory Presentation
- Wear Particle Generation
- Tribology, Friction, and Wear
- Lubrication Fundamentals
- Sample Screening: Discussion of how to use preliminary data and equipment type to select WDA candidates and sample preparation techniques.
- Interpretation of Oil Analysis Results Related to WDA such as OilView Indices and Commercial Oil Laboratory Data
- Sample Preparation Techniques: Discussion of Sample Preparation for Grease, Oil, Hydraulic Fluid, and Synthetics
- Disciplined and Systematic Approach to WDA: Overview of the OilView WDA Module
- Particle Identification and Characterization Exercise
- Identification and Characterization of Wear Debris Using Photographs and/or Live Samples

Infrared Analysis Software for AMS Machinery Health™ Manager

Course 2018 CEUs: 2.1

Overview

This 3-day course is designed for maintenance personnel who want to learn how to incorporate infrared-related data into AMS Machinery Manager. Infrared analysis establishes the foundation and provides the tools required for a sound thermography inspection program. It identifies the equipment to be scanned, the monitoring schedule, and other information needed to construct a database that defines the monitoring procedures for your program.

Prerequisites

Computer experience with the Windows operating system is recommended.

Topics

- Overview of AMS Machinery Manager
- Thermographic Database Setup Management
- Thermographic Route Management
- File Transfer to/from IR Imager
- IR Event cCollection
- Image Viewing and Event Reporting
- IR Analysis Tools
- IR Reporting
- Case History Compilation

IR Thermography Level I with Certification

Course 2019 CEUs: 2.8

Overview

This 4-day course is intended for students who have limited or no experience in infrared thermography analysis and diagnostics. Emerson thermography courses meet or exceed Level 1 ASNTTC- 1A recommended practices. Successful completion of the courses and passing of optional examinations may lead to a Level I certification.

Prerequisites

None.

Topics

- Physics of Infrared Energy
- Components of Infrared Light
- System Components and Data Collection
- Setting Acceptance Criteria for Electrical and Mechanical Components
- Data Storage, Trending, and Reports
- System Coordination with Other PdM Technologies
- Built-Up Roofs

Basic Ultrasonic Theory and Techniques - Level 1

Course 2067 CEUs: 2.1

Overview

This 3-day level I course is a comprehensive course for individuals with little or no experience in ultrasonic testing. Although introductory, the course offers in-depth coverage of ultrasonic theory and instrument operation. Through lecture and lab exercises, students gain an understanding of technical principles and test procedures.

Topics

- Introduction to Ultrasonics
- Basic Principles of Acoustics
- Measurement Techniques
- Testing Methods

Also Available: Ultrasonics Level I Certification Exam.

Balance Theory and Application

Course 2015 CEUs: 2.8

Overview

This 4-day teaches how to perform single- and dual-plane balancing using both graphical and analyzer-based balancing methods. The class uses the CSI 2130 Machinery Health Analyzer.

Topics

- Imbalance Identification
- Use of Vectors
- Calculating Influence Coefficients
- Use of the Auxiliary Analyzer Balance Functions
- Use of UltraMgr Module
- Calculating a System Lag
- Estimate Trial Weights
- Balancing Flexible Rotor Systems
- Balancing Overhung Rotors
- Applying Balancing Reqniques in an Industrial Setting

Note: May be taken as two 2-day classes



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Laser Alignment for CSI 2130**Course 2092 CEUs: 1.8****Overview**

This 2-1/2 day class is intended for students who have limited or no alignment experience. It provides training on shaft alignment using CSI technologies focusing on the CSI 2130 Machinery Health Analyzer. This course includes hands-on training with horizontal alignment and vertical alignment demonstrators and covers management of an alignment program using the AMS Machinery Health Manager software.

Topics

- Alignment: What is it? Why?
- Required Pre-Shutdown Checks
- Pre-alignment Checks and Corrections
- The Science and Art of Alignment
- Tools & Techniques for Moving Equipment
- Time-Savers
- Alignment Information Management
- Management Systems: Methods and Advantages

Root Cause Failure Analysis**Course 2053 CEUs: 2.1**

Overview This 3-day course provides participants with the tools they need to begin the process of identifying Root Cause Failure Analysis (RCFA). This course was designed for managers, engineers and technicians who want to establish a RCFA program as a way of enhancing an existing predictive/ preventive maintenance program. The course introduces the various facets of benchmark RCFA programs.

Prerequisites

One to two years of experience with a predictive maintenance program is recommended. No specific knowledge of predictive technologies is required.

Topics

- Failure Definitions and Types of Failure
- Establishing a RCFA Program
- When to Initiate Investigation
- RCFA Investigation Methodology
- Cost/Benefit Evaluation and Performance Metrics
- Review of Machinery and Component Failure Modes
- Case Histories





At the foundation of any process are the field devices that measure and control the flow of air, steam, water, gas or hundreds of other materials. Without proper basic setup, calibration and configuration of these devices, advanced control techniques cannot provide the levels of efficiency the technology is capable of.

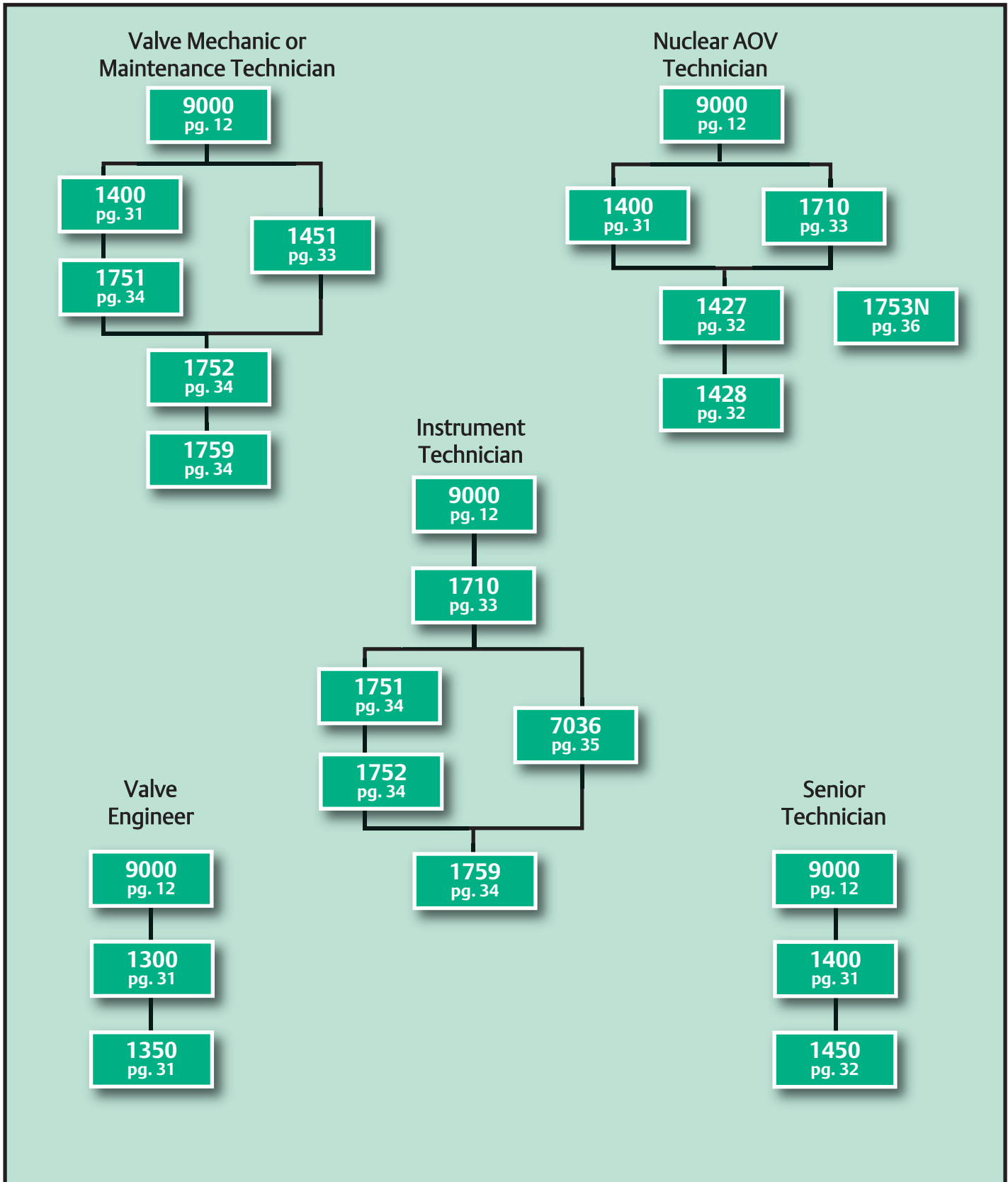
Knowledge of process control devices within a plant is often passed down from generation to generation. At the same time, if advances in process technology and methodology usually brought about by training aren't brought into the plant, in-house standards for device setup and maintenance can become based on out-dated theory. The result is that while a valve or instrument may be working, it may not be working up to its capabilities and is not delivering on its promised performance.

Educational Services has made a global commitment to helping our customers find and keep that promise of performance.

Control Valves	30
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Micro Motion	40
Regulator Technologies, Regulators and Gas Control	43
Remote Automation Solutions, ROC & FloBoss	44
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LEARNING PATH



Control Valves The twin forces of advancing technology, exemplified by the rapid acceptance of FIELDVUE digital valve controllers, and the merging of the valve and instrument technician crafts in many plants are making control valve education more important today than ever before. These interrelated trends necessitate higher levels of education on the part of those responsible for valve engineering, maintenance and operation. Courses for valve and instrument technicians explain what's required to maintain modern control valves and demonstrate the skills necessary to do that job effectively. These classes are very structured, but students have plenty of opportunities to practice newly learned skills and receive feedback from experts in the field. The goal is to reduce the number of poorly operating control valves throughout industry in order to enhance processing and reduce downtime.



Control Valve Engineering I

Course 1300 CEUs: 3.2

This course is for engineers, technicians and others responsible for the selection, sizing, and application of control valves, actuators and control valve instrumentation.

Overview

This 4-1/2 day course reviews design and operating principles of control valves, actuators, positioners and related accessories. It describes the sizing and selection methods for a broad variety of control valves assemblies. Students will solve several demonstration sizing and selection problems using Fisher Specification Manager and published materials, plus participate in equipment demonstrations and hands-on workshops. Students who complete this course will:

- select the proper valve characteristic for a given process
- choose suitable styles of control valves for an application
- size control valves and actuators
- select the best actuator for all applications
- properly apply positioners and instruments

Prerequisites

Some experience with industrial controls equipment including control valves and actuators would be helpful.

Topics

- Actuator Selection and Sizing
- Cavitation
- Control Valve Selection: Rotary/Sliding Stem
- Corrosion Resistant Valves
- Liquid Valve Sizing
- Positioners and Transducers
- Valve Application Guidelines
- Valve Characteristics
- Valve Packing Considerations
- Valve Noise
- Gas Valve Sizing

Control Valve Engineering II

Course 1350 CEUs: 3.2

This course is for practicing engineers and senior technicians who are seeking advanced training in control valve selection and sizing, and application problem solving.

Overview

This 4-1/2 day course proceeds from a review of basic sizing and selection concepts to advanced concepts used when selecting and sizing control valves for severe service and unusual applications. The course includes lectures and numerous problem-solving sessions that make extensive use of Fisher Specification Manager software and other sizing and selection tools. Students who complete the course will:

- select and size control valves to reduce aerodynamic noise
- select and size control valves for cavitating applications
- select valve types and options for corrosive and erosive fluids
- size control valves for two-phase flow and hydrocarbon mixtures

Prerequisites

Control Valve Engineering course (Course 1300) or have equivalent experience (minimum of two years specifying control valves and instrumentation). Familiarity with Fisher Specification Manager is required.

Topics

- Aerodynamic Noise/Whisper Trim
- Cavitation Issues and Solutions
- Steam Conditioning Valves
- High Pressure/Temperature Issues
- Sizing for Two Phase Flow, Fluid Mixtures
- Corrosive/Erosive Service
- Actuators: Stroking Speed, Hysteresis, and Other Control Application Guidelines

Valve Technician I

Course 1400 CEUs: 3.2

Overview

This 4-1/2 day course explains how valves and actuators function and how they are installed and calibrated. It emphasizes installation, troubleshooting, parts replacement, and calibration of control valves, actuators, positioners and digital valve controllers. Students spend over 50% of their time in hands-on workshops. Those who complete this course will be able to:

- correctly perform installation procedures
- perform basic troubleshooting
- properly apply and calibrate, positioners and digital valve controllers
- change valve trim, gaskets and packing

Prerequisites

Some experience in instrument calibration and in control valve maintenance, installation, and operation would be helpful.

Topics

- Control Valve Terminology
- Globe Valves
- Packing
- Actuators, Positioners and Digital Valve Controllers
- Bench Set
- Seat Leak Testing
- Ball Valves
- Butterfly Valves
- Eccentric Disc Valves
- Special Service Valves
- Valve Characteristics
- Control Valve Noise and Cavitation

(Note: Valve Technician II, Course 1450 to enroll call 780-468-5463.)

To enroll in Control Valve courses please call 800-338-8158 or 641-754-3771. For additional contact information refer to the appropriate contact on page 109. Updated dates & locations are available on our website at www.emersonprocess.com/education.

Valve Technician II
Course 1450 CEUs: 3.2
Overview

This advanced course is for experienced personnel who will benefit from a broadened perspective of control valve performance and maintenance issues. Students are typically experienced valve mechanics and maintenance personnel, instrument technicians, and others who are responsible for total control valve and control loop performance.

Prerequisites

Valve Technician I, Course 1400

Topics

- Control Loop Basics
- Major Loop Components and Their Functions
- Piping & Instrumentation Drawings (P & ID's)
- Basic Component Symbolology
- Connections and Wiring
- Control Loop Performance
- Loop Performance Objectives
- Influences On Loop Performance
- Valve Selection and Sizing
- Actuator Sizing
- Bench Set and Stem Connection
- Loading Pressure Instrument Selection
- Loading Pressure Instrument Calibration
- Accessory Selection and Configuration
- Controller Tuning
- Severe Service Considerations
- Troubleshooting Basics
- Diagnostics
- Process Variability
- Performance Maintenance Issues

FlowScanner Data Acquisition and Interpretation
Course 1427 CEUs: 2.8

This course is for personnel who will perform and interpret control valve diagnostic testing using a FlowScanner.

Overview

This 4-day course uses lecture and hands-on labs to teach students to properly acquire and analyze diagnostic data using the FlowScanner. This course teaches proper setup of hardware and software, accurate entry of data, and other procedures that are required to ensure accuracy when acquiring data. Also covered are good techniques in interpreting and analyzing the collected data. Actual case histories form a basis for teaching interpretation skills. Students will test and diagnose a sampling of valves in which specific problems have been introduced. Students who complete this will:

- navigate features of FlowScanner software
- correctly mount sensors and related FlowScanner hardware on standard air-operated valves (AOV's)
- enter valve, instrument, and actuator data
- correctly enter test parameters
- perform various step and stroking tests to collect diagnostic data
- analyze typical/atypical, FlowScanner data
- create/view standard FlowScanner reports

Prerequisites

Course 1400 or course 1710, or significant experience in valve and instrument operation/maintenance procedures.

Topics

- FlowScanner Hardware/Software Overview
- In-Depth Software Navigation
- Setup and Testing Techniques
- Data Entry & Test Criteria Best Practices
- Data Management
- Report Generation/Expected Results
- Background Software Routines and Equations for the Analysis Numbers
- Case Study Analysis- Including Discussions of Valve/Instrument/Installation Problems
- Laboratory Activities/Support

Advanced FlowScanner Diagnostic Interpretation
Course 1428 CEUs: 1.8

This 3-1/2 day course is for personnel who are responsible for interpreting plots and other diagnostic data that is acquired with the Fisher FlowScanner. This course focuses on data interpretation. Data acquisition is taught in Course 1427.

Overview

Because of the advanced nature of this class, the pre-requisite is strictly enforced. A pre-test and a control valve awareness test are used to confirm applicant readiness. A brief review of FlowScanner software confirms student familiarity with test setups, pressure and travel channels, and the objectives of all available test procedures. The course is based on a structured combination of lectures and hands-on labs to teach students how to identify problems in control valve assemblies. Emphasis is placed on determining and confirming overall control valve health and condition by examining each of the major components of the assembly: I/P, positioner, actuator, and valve body. Report generation and some field tips are also presented. To capitalize on learning from shared experiences, students are encouraged to bring in test data from an interesting scenario or a current problem. Those who complete this course will:

- select the appropriate FlowScanner test for a given scenario.
- understand the impact of scan rates on the appearance and interpretation of acquired data.
- analyze FlowScanner test data to determine overall control valve health by evaluating the condition of the various components of the assembly.
- identify multiple anomalies in a single assembly.
- use FlowScanner functions to generate Quick Reports.
- learn how to perform a step test on a discrete valve without interrupting power to the valve.

Prerequisites

Course 1427 and a minimum of six months of diagnostic testing with the FlowScanner.

Topics

- Review of Various FlowScanner Tests and Specific Objectives of Each
- Impact of Test Configuration Errors
- Data Interpretation from Tests of "Bugged" Valve Assemblies
- Multiple Anomalies Found in Control Valves
- Exporting Data
- Generating Quick Reports
- Interpretation of Difficult Uncovered Control Valve Problems

Note: Educational Services supplies all Control Valve equipment and FlowScanners. No Exceptions.

Instrument Technician

Course 1710 CEUs: 3.2

This course is for instrument technicians responsible for pneumatic and electronic instrument calibration, installation and troubleshooting.

Overview

This 4-1/2 day course covers the principles of operation, calibration and installation procedures for electronic and pneumatic instruments. Computer process simulations and live loops are used to demonstrate loop dynamics. Approximately 50% of this course consists of hands-on workshops. Students will:

- calibrate a variety of pneumatic and electronic instruments
- correctly perform installation procedures
- perform basic troubleshooting, basic controller tuning, and positioner and digital valve controller application

Prerequisites

Some experience in electronic and pneumatic instrument maintenance and calibration would be helpful, but not required.

Topics

- Actuators and Bench Set
- Controller Tuning
- Current to Pneumatic (I/P) Transducers
- Instrument Terminology
- Pneumatic Temperature Controllers (Filled Bulb)
- Pneumatic Pressure Controllers
- Pneumatic and Electro-Pneumatic Positioners
- Pneumatic Displacer Level Controllers
- FIELDVUE Digital Valve Controller
- Pneumatic and Digital Level Transmitters

PC-ControlLAB™ 3 and Builder (Part # D750496X012) is used in course 1710. For more information, visit our website at: emersonprocess.com/education

Valve Maintenance with Digital Valve Controller Calibration

Course 1451 CEUs: 3.2

Overview

This is a 4-1/2 day session. The first 2-days of the course will cover sliding stem and rotary valves and actuators. Topics will include valve and actuator setup, maintenance, repair and troubleshooting. The following 2-1/2 days will be focused on the installation and calibration of the DVC 2000 and 6000 series digital valve controllers using the handheld communicator.

An overview of AMS ValveLink® Software will be included. Students spend 50% of their time in hands-on workshops. Students who complete this course will be able to:

- correctly perform installation procedures
- perform basic troubleshooting
- change valve trim, gaskets and packing
- install and mount a digital valve controller onto a sliding stem actuator/valve and rotary actuator/valve
- configure and calibrate FIELDVUE® Instruments with the HART Model 375 or 475 Communicator

Prerequisites

Experience in instrument calibration and in control valve maintenance, installation, and operation would be helpful.

Topics

- Control Valve Terminology
- Globe Valves/Packing
- Actuators
- Bench Set
- Ball Valves / Butterfly Valves / Eccentric Disc Valves
- Valve Characteristics
- Control Valve Noise and Cavitation
- Digital Valve Controller Theory of Operation
- HART Communication Signal
- FIELDVUE Instrument Installation
- HART Model 375/475 Handheld Communicator
- Instrument Configuration and Calibration
- Instrument Troubleshooting
- Control Loop Wiring Practices

FIELDVUE Digital Valve Controller Setup and Diagnostics using Handheld Field Communicator and ValveLink

Course 1750 NEW CEUs: 3.2*

This a 4-1/2 day course [4 days for regionals and locals/on-site training] is for technicians, engineers, and others responsible for installing, configuring, calibrating, and basic troubleshooting of FIELDVUE Digital Valve Controllers using Handheld Field Communicators (375, 475) and ValveLink Software.

Overview

The course provides the fundamental skills necessary to install and mount a DVC2000, DVC6000, and DVC6200 instrument onto a Sliding Stem and Rotary Valve / Actuator, and to configure and calibrate FIELDVUE instruments using the HART Model 375 / 475 Field Communicator. Students will also be able to execute ValveLink Diagnostic routines and create an instrument database.

Prerequisites

At least one year of control valve experience and/or course 1400 (Valve Technician I).

Topics

- FIELDVUE theory of operation
- DVC2000 & DVC600 Digital Valve Controller
- FIELDVUE Instrument Installation
- HART Model 375 or 475 Handheld Field Communicator
- Handheld Configuration and Calibration
- Instrument Troubleshooting
- Control Loop Wiring Practices & Tri-loop
- Introduction to AMS ValveLink
- ValveLink Tag and Database Issues
- Configuration and Calibration with ValveLink
- ValveLink Diagnostics
- HART Multiplexer
- ValveLink Performance Diagnostics
- ValveLink Troubleshooting

* 2.8 CEUs for Regional and Local/On-Site Training

To enroll in Control Valve courses please call 800-338-8158 or 641-754-3771. For additional contact information refer to the appropriate contact on page 109. Updated dates & locations are available on our website at www.emersonprocess.com/education.



Fundamentals of HART Based FIELDVUE Digital Instruments and the Handheld Communicators

Course 1751 CEUs: 1.4

This course is for technicians, engineers and others responsible for installing, calibrating and basic troubleshooting FIELDVUE and related instruments using the 375/475 Handheld Communicator. The primary focus of this course is to provide a comprehensive experience in managing digital valve controllers using the HART 375 or 475 Handheld Communicator.

Overview

This 2-day course provides the fundamental skills necessary to:

- install and mount a DVC2000 & DVC6000/6200 instrument onto a Sliding Stem Actuator/ Valve and Rotary Actuator/Valve Assemblies
- configure and calibrate FIELDVUE Instruments with the HART Model 375/475 Handheld Communicator

This lecture/lab style course provides maximum class time with hands-on experience working with FIELDVUE instrumentation and the HART Model 375/475 Handheld Communicator. Proper configuration and calibration of the Digital Valve Controller will be featured.

Prerequisites

One to two years of control valve experience and/or course 1400, (Valve Technician I).

Topics

- FIELDVUE Theory of Operation
- DVC2000 & DVC6000/6200 Digital Valve Controllers
- FIELDVUE Instrument Installation
- HART Model 375/475 Handheld Communicator
- Instrument Configuration and Calibration
- Instrument Troubleshooting
- Control Loop Wiring Practices, Tri-loop and 775 Thum
- ValveLink™ Mobile Overview

ValveLink™ Software and Diagnostics for FIELDVUE - Operations

Course 1752 CEUs: 1.8

This course is for technicians, engineers and others responsible for installation, calibration and diagnostics for DVC FIELDVUE instruments and software. The primary focus of this course is to provide a comprehensive experience in managing digital valve controllers using the ValveLink™ software.

Overview

This 2-1/2 day lecture/lab style course provides maximum class time with hands-on experience working with FIELDVUE DVC instrumentation and ValveLink™ Diagnostic Software. Students will be able to execute ValveLink™ Diagnostic routines and create an instrument database. HART multiplexer technology will also be explored. This is a continuation of course 1751, Fundamentals of FIELDVUE Digital Instruments and the 375/475 Handheld Communicator.

Prerequisites

Fundamentals of FIELDVUE and the 375/475 Handheld Communicator, (Course 1751) or Valve Maintenance with Digital Valve Controller Calibration (Course 1451) or Instrument Technician (Course 1710)

Topics

- Introduction to ValveLink™ Software
- ValveLink™ Tag and Database Management
- Configuration with ValveLink™
- Calibration with ValveLink™
- ValveLink™ Advanced and Performance Tier Diagnostics
- HART Multiplexer
- Troubleshooting



ValveLink™ Diagnostics for FIELDVUE - Digital Valve Controller Data Interpretation

Course 1759 CEUs: 1.8

This course is designed to teach the techniques necessary to collect and interpret valve diagnostic tests performed using ValveLink™ software.

Overview

This 2-1/2 day course uses classroom lectures and hands on workshops to teach the student to interpret and analyze diagnostic data obtained using FIELDVUE Digital Valve Controllers and ValveLink™ software. Students will perform diagnostic tests on a variety of valve/actuator combinations and use the data to determine bench set, dynamic error band, seat load, spring rate and other pertinent parameters. Students will also perform comparison tests on valves/actuators containing assembly or operating flaws and use the data for troubleshooting purposes. Students who complete this course will:

- use/understand diagnostic terminology
- interpret ValveLink™ diagnostic traces and determine bench set, packing friction, seat load, spring rate, dynamic error band and a number of other common valve parameters
- use diagnostic traces to troubleshoot problems in valve/actuator assemblies
- use on-line Performance Diagnostics to troubleshoot/analyze friction & dead-band

Prerequisites Students must have completed courses: 1751 & 1752 prior to attending.

Topics

- Pneumatic Control Valve Terminology
- Features of the Digital Valve Controller and ValveLink™ Software
- ValveLink™ Diagnostic Tests
- Data Interpretation
- Troubleshooting Techniques
- Comparison Testing Techniques
- Performance Diagnostics

AMS Device Manager with Fisher HART

Course 7022 CEUs: 2.1

This 3-day course is designed to teach technicians and engineers how to commission, calibrate, configure, maintain, and troubleshoot Fisher smart devices using AMS Device Manager and the ValveLink SNAP-ON.

Overview

The course begins with an introduction to the features and functionality of the AMS Device Manager. It proceeds to discuss important database design and management issues, and then delves into device-specific techniques for commissioning, maintaining, and troubleshooting the following Fisher smart devices:

- DVC6000 / DVC6200 / DLC3000 Instruments

Prerequisites

None, though a basic familiarity with Fisher smart devices will be beneficial.

Topics

- Introduction to AMS Device Manager
- Getting Started with AMS Device Manager
- Viewing and Modifying Devices
- Role and Function of the Database
- Database Architecture
- Database Design Considerations
- Database Maintenance Issues
- Managing Device Configurations
- Replacing and Deleting Devices
- HART Communicator
- Using the Audit Trail
- Monitoring System Alerts
- DVC6000 View from AMS Device Manager
- ValveLink SNAP-ON Features and Functionality
- ValveLink SNAP-ON Digital Valve Controller Diagnostics



FOUNDATION™ fieldbus FIELDVUE

Course 7036 CEUs: 2.1

This 3-day course is designed to teach technicians and engineers the basics of FOUNDATION™ fieldbus digital valve controller installation, configuration, calibration, and troubleshooting using 375/475 Handheld, ValveLink™ software and DeltaV, and AMS Intelligent Device Manager.

Overview

The course begins with a review of the role and function of control valve positioners and proceeds through a series of hands-on exercises that require the student to disassemble, inspect, assemble, install, and commission a fieldbus digital valve controller. During commissioning, students will learn the basics of the FOUNDATION™ fieldbus protocol, the role of function blocks, addressing, modes and status. Students will configure, calibrate, and commission devices using both 375/475 Handheld, ValveLink™ software and DeltaV. Hands-on exercises also teach students how to perform detailed setup routines and how to run and collect data for various ValveLink™ diagnostics. The class ends with a troubleshooting session that presents common problems and their solutions.

Prerequisites A basic familiarity with positioners - preferably digital valve controllers - and control valve basics is required. Courses 1400, 1751 and 1752 are recommended.

Topics

- Positioner Basics
- FOUNDATION™ fieldbus Overview
- Digital Valve Controller Installation and Mounting
- Modes and Status
- Configuration/Calibration with DeltaV™
- Configuration and Calibration with the 375/475 Field Communicator
- Intro. to AMS ValveLink Fieldbus Functionality
- ValveLink™ Setup Wizard/Detailed Setup
- Tuning
- Tag Management
- Pressure Control
- ValveLink™ Diagnostics
- FIELDVUE Instrument Troubleshooting
- (Optional) Configuration/Calibration with NI Tools

Baumann Valve Technician

Course 1402 CEUs: 2.1

Overview

This 3-day course explains how Baumann valves and actuators function and how they are installed and calibrated. It emphasizes installation, troubleshooting, parts replacement, and calibration of control valves, actuators, positioners and digital valve controllers. Students spend over 50% of their time in hands-on workshops. Several of the workshops will be lead by Baumann assemblers. Those who complete this course will be able to:

- correctly perform installation procedures
- perform basic troubleshooting
- properly apply and calibrate positioners and digital valve controllers
- change valve trim, gaskets and packing
- properly adjust sanitary valves

Prerequisites

Some experience in instrument calibration and in control valve maintenance, installation, and operation would be helpful.

Topics

- 24000 Series
- 42000 Series
- 83000 & 84000 Sanitary Valves
- 21000 & 25000 Series Butterfly
- Low Flow and Specialty Valves
- Packing
- Bench Set
- Seat Leak Testing
- Actuators
- Positioners and Digital Valve Controllers

To enroll in Control Valve courses please call 800-338-8158 or 641-754-3771. For additional contact information refer to the appropriate contact on page 109. Updated dates & locations are available on our website at www.emersonprocess.com/education.

Daniel

Daniel has brought acclaimed gas and liquid fiscal flow measurement products, services and systems to the oil and gas industry. Around the world, the Daniel name is synonymous with quality, reliability and commitment to serving its customers.



Introduction to Natural Gas Orifice Measurement

Course D4120

Overview

This 3-day course covers basic principles, application, operation, calculation and maintenance of meters used in the measurement of gas with emphasis on natural gas. The course is designed for Engineers, field technicians and accounting personnel. Practical examples of real metering facilities will be covered.

Topics

- Introduction and Overview: Definition of Flow Measurement and a Brief History and Coverage of Common Terms Used in Gas Measurement
- Introduction to Types of Meters
 - Positive Displacement
 - Inferential Head Turbine
 - Others
- Standards for Gas Measurement
- Principles of Meter Operation and Systems
 - Positive Displacement
 - Flow Requirements
 - Measurement System (Readout)
- Meter Details
 - Orifice
 - Nozzle
 - Positive Displacement
 - Ultrasonic
 - Vortex Shedding
 - Target
 - Other
- Secondary System Details
 - Mechanical
 - Electronic
- Accuracy
 - Source of Inaccuracy
- System
- Summary
 - Accuracy
 - Economics

Note: Courses typically start at 8 AM on Wednesday and end at 12 PM on Friday to accommodate travel.

Advanced Natural Gas Orifice Flow Measurement

Course D4320

Overview

This 3-day course covers application of metering to natural gas. The course is designed for experienced gas measurement personnel with basic fundamental knowledge of meters and their operation. Coverage of the latest concepts of design and equipment use will be presented to broaden the knowledge of the attendees.

Topics

- Design of Meter Stations
 - Contract Requirements
 - Other Concerns
 - Single Versus Multiple Tubes
 - Design Problems
 - Economics Versus Accuracy
- Accuracy of Gas Flow Measurement
 - Definition
 - How Obtained
 - New Concepts
- Influences In Gas Measurement
 - FERC 636 (Government)
 - Economics
 - Standards
 - New Technology
- New Metering Concepts
 - Computers as Analysis
 - New Devices
 - Ultrasonics
 - Vortex Shedding
 - Coriolis
- Future
 - Energy Forecasts
 - U.S. Gas Industry
 - World Gas Industry
- Summary

Note: Courses typically start at 8 AM on Wednesday and end at 12 PM on Friday to accommodate travel.

Introduction to Model 500 and 700 Gas Chromatographs

Course D4100

Overview

This 3-day course provides students with a basic understanding of how a gas chromatograph works, emphasizing chromatograph fundamentals and basic theory. The only prerequisites are basic computer skills. DMS provides an experienced on-site instructor as well as all necessary equipment and handouts for the course.

Topics

- Basic Chromatography Principles and Their Application to Gas Measurement
- Basic Chemistry, Flow Configuration and Carrier and Calibration Gas Systems
- Basic Sample Systems
- Basic Chromatograph Hardware
- Timed Events, Retention Times, Response Factors
- Data Calculations and Control Parameters
- Using Chromatograms to Identify Problems
- Identifying Gas Components
- Calibrating a Gas Chromatograph
- Operation of MON Software

Note: Courses typically start at 8 AM on Wednesday and end at 12 PM on Friday to accommodate travel.

Operation and Maintenance of the Model 500 Gas Chromatographs

Course D4210

Overview

This 5-day course prepares students to operate and/or repair model 500 gas chromatograph. As a prerequisite, a student should either have worked with a chromatograph for at least six months or attended the DMS Introduction to Gas Chromatographs Class. Students receive four days of hands-on instruction and all necessary equipment and training materials.

Topics

- What a Gas Chromatograph is and How it Operates
- Using the Basic Chromatograph System in Natural Gas Analysis
- Carrier and Calibration Gas Systems
- Chromatograph Hardware
- Installation and Operation of MON Software
- Chromatogram Integration and Post-Analysis Calculations
- Using the Chromatogram to Identify Problems
- Setting Timed Events, Retention Times and Response Factors
- Start-Up Procedures
- Sample Handling System
- Verifying that the Chromatograph is Operating Properly
- Troubleshooting the 2350A Controller and the Chromatograph
- Configuring the 2350A Controller User Directory Outputs
- Preventative Maintenance Service Procedures
- Communication of Gas Data to Other Devices, such as a Flow Computer or DCS
- Spare Parts and Necessary Service Tools

Note: Courses typically start at 1 PM on Monday and end at 12 PM on Friday to accommodate travel.

Operation and Maintenance of the Model 700 Gas Chromatographs

Course D4212

Overview

This 5-day course prepares students to operate and/or repair a gas chromatograph. As a prerequisite, a student should either have worked with a chromatograph for at least six months or attended the DMS Introduction to Gas Chromatographs Class. Students receive four days of hands-on instruction and all necessary equipment and training materials.

Topics

- What a Gas Chromatograph is and How it Operates
- Using the basic Chromatograph System in Natural Gas Analysis
- Carrier and Calibration Gas Systems
- Chromatograph Hardware
- Installation and Operation of MON Software
- Chromatogram Integration and Post-Analysis Calculations
- Using the Chromatogram to Identify Problems
- Setting Timed Events, Retention Times and Response Factors
- Start-Up Procedures
- Sample Handling System
- Verifying that the Chromatograph is Operating Properly
- Preventative Maintenance Service Procedures
- Communication of Gas Data to Other Devices, such as a Flow Computer or DCS
- Spare Parts and Necessary Service Tools

Note: Courses typically start at 1 PM on Monday and end at 12 PM on Friday to accommodate travel.

Advanced Model 500 Gas Chromatograph

Course D4310

Overview

This 5-day course provides students with an advanced understanding of gas chromatograph operation, troubleshooting, and maintenance. Computer operation skills are a prerequisite, along with either three years of chromatography experience or completion of the DMS Operation & Maintenance of Gas Chromatographs Course. We supply all necessary handouts for the course. Our highly experienced instructor can provide additional insight into your specific applications when you provide your chromatograph sales order number and application information.

Topics

- Process Chromatograph Flow Configurations
- Overhauling Valves
- Thermal Conductivity, Flame Ionization and Flame Photometric Detectors
- Sample, Carrier and Calibration Gas Systems
- 2350A Controller Hardware
- Installing and Using MON Software for Integration and Calculations
- Setting Timed Events, Retention Times and Response Factor Calculations
- Start up Procedures
- Setting Valve Timing and Flows with Different Flow Configurations
- Checking for Proper Separation and Analyzing Chromatograms
- Verifying that the Chromatograph is Operating Properly
- Troubleshooting the Chromatograph and 2350A Controller
- Configuring Reporting Details and Control Outputs
- Preventative Maintenance Service Procedures
- Communications and Modbus Registers
- Spare Parts and Tools

Note: Courses typically start at 1 PM on Monday and end at 12 PM on Friday to accommodate travel.

To enroll in Daniel courses please call 713-827-6314. For additional contact information refer to the appropriate contact on page 109. Updated dates & locations are available on our website at www.emersonprocess.com/education.

Model 700 Advanced Gas Chromatograph

Course D4330

Overview

This 5-day course is most valuable to those with three years of chromatography experience, or those who have completed the introductory Daniel Operation and Maintenance of Gas Chromatographs course. Participants will develop an advanced understanding of gas chromatograph operation, troubleshooting and maintenance. Training even becomes "customized" when students present a chromatograph sales order number and application information. Given that data, the experienced Daniel instructor will look closely at specific applications and offer participants even more insight.

Prerequisites

D4210 Operation and Maintenance of Gas Chromatographs. Students should also be proficient in personal computer operations and have a basic knowledge of flow measurement.

Topics

- Chromatograph Flow Configurations
- Valve Overhaul
- Thermal Conductivity, Flame Ionization and Flame Photometric Detectors
- Sample, Carrier and Calibration Gas Systems
- Model 700 Hardware
- Installing and Using MON Software for Integration and Calibration
- Setting Timed Events, Retention Times and Response Factor Calculations
- Start-Up Procedures
- Setting Valve Timing and Flows with Different Flow Configurations
- Checking for Proper Separation and Analyzing Gas Chromatographs
- Verifying that the Chromatograph is Operating Properly
- Troubleshooting the Model 700 GC
- Configuring Reporting Details/Control Outputs
- Preventive Maintenance Service Procedures
- Communications and Modbus Registers
- Spare Parts and Tools

Note: Courses typically start at 1 PM on Monday and end at 12 PM on Friday to accommodate travel.

700XA Gas Chromatograph

Course D4313

Overview

This 5-day course is appropriate for those who have either worked with a chromatograph for at least six months or completed the 'Introduction to Gas Chromatographs' course. It prepares participants to operate and repair the new Analyzer 700XA gas chromatograph for natural gas applications and will focus on the improvements in analyzer design and the new MON 2020 diagnostics and configuration software.

Topics

- Hands-on Learning That Explains the Chromatograph, How it Operates, and What it Does to Analyze Natural Gas
- 700XA Chromatograph Hardware
- Installation and Operation of MON2020 Software
- Dual Detector Applications (C9+) and the Hydrocarbon Dew Point Calculation
- Identifying Problems, Setting Timed Events, Preparing Samples, and Implementing Preventive Maintenance Procedures
- Troubleshooting
- Spare Parts and Service Tools

Note: Courses typically start at 1 PM on Monday and end at 12 PM on Friday to accommodate travel

Operation and Maintenance of Gas/Liquid Ultrasonic Meters

Course D4230/D4280

Overview

This 5-day course prepares students to install, operate, and maintain Daniel multipath ultrasonic gas flow meters. In addition to four days of instruction by one of our experienced instructors, each student receives a 12-section training manual.

Topics

- Basics of Sound Waves
- How Ultrasonic Flow Meters Work and Their Advantages over other Meters
- The Performance Characteristics of Transit Time Ultrasonic Flow Meters
- System Components and Mark III Electronics, including the Central Processing Unit (CPU) Board and the Option Board
- Meter Mechanics
- Removal and Installation of Transducer Assemblies
- Volumetric and Mass Ultrasonic Gas Flow Measurement
- Meter Installation Considerations
- Inform the Instructor if Working on Liquid Meter

Note: Courses typically start at 1 PM on Monday and end at 12 PM on Friday to accommodate travel

Introduction to Daniel Sr. Orifice Fitting

Course D4420

Overview

This 1-day course is for the beginner or experienced technicians. The students will learn the operation and how to repair and troubleshoot the Model 2000.

Prerequisites

Basic knowledge for flow measurement.

Topics

- Theory of Operation
- "C" Style vs. Model 2000
- Maintenance
- Operating Instructions
- Installation
- Hands-on Learning
- Troubleshooting
- New Features of M2000

Note: Courses typically start at 8 AM on Wednesday and end at 12 PM on Friday to accommodate travel.

Operation and Maintenance of Daniel S600 Flow Computers

Course D4260

Overview

This 2-day course provides students with an appreciation of the operation, design, capabilities and configuration of the S600 flow computer. This hands-on course deals with file transfer and machine recovery as part of the maintenance scope. The instructor will make use of the latest configuration software. Full supporting literature will be made available to all students.

Prerequisites

Basic knowledge of flow measurement.

Topics

- Introduction to the S600
- Board Removal and Layout
- Keypad Access and Security
- Menu Navigation
- Data/Mode Changing
- Alarm Handling and Configuration
- Configuring and Generating Reports
- Application Specific Functions
- Cold/Warm Starting Modes
- File Back-Up and Download
- Using the Configuration Software

Note: Courses typically start at 8 AM on Wednesday and end at 12 PM on Friday to accommodate travel.

Operation and Maintenance of the Daniel Compact Prover™

Course D4270

Overview

This 3-day course covers the operation, installation and maintenance of the Daniel Compact Prover™.

Prerequisites

Basic knowledge of flow measurement.

Topics

- Theory of Operation: Double Chronometry and Specifications
- Overview of the Parts Which Make up the Compact Prover such as Actuator Assembly, Pneumatic Spring Chamber, Piston and Poppet, Optical Switches, Hydraulic Motor and Pump, and Solenoid Valve
- Installation: Prover and Meter Location, Nitrogen Spring Plenum Setting, and Power Requirements
- Troubleshooting and Repair of: Safety Barriers, Seal and O-ring Replacement, Safety Barriers, Detector Switches, Interface Board, Hydraulic and Nitrogen System, and Spare Parts
- Overview of Calibration: Seal Leak Test, Upstream and Downstream Calibration, and Waterdraw Data Sheet
- Overview of Prover Electronics: Programming, Input and Data Modes Using Software/Local Display, Circuit Module Description, and Diagnostics

Note: Courses typically start at 8 AM on Wednesday and end at 12 PM on Friday to accommodate travel.

Operation and Maintenance to Control Valves and Turbines

Course D4290

Overview

This 3-day course covers the operation, installation and maintenance of the Daniel control valves and turbines.

Prerequisites

Basic knowledge of flow measurement.

Topics

- Theory of operation: Turbines, Valves, Digital Pilots
- Disassembly and Reassembly of Turbine Internals
- Disassembly and Reassembly of Valve Cylinder Assemblies
- Disassembly and Reassembly of Digital Pilots
- Valve Needle Valve Adjustment
- 'A' series vs. 'B' Series Control Valves
- Turbine Pick-Off Sensor and Preamp
- Flow Conditioning
- Parity vs UMB Series Turbine Meter
- Troubleshooting

Note: Courses typically start at 8 AM on Wednesday and end at 12 PM on Friday to accommodate travel.



To enroll in Daniel courses please call 713-827-6314.
For additional contact information refer to the appropriate contact on page 109. Updated dates & locations are available on our website at www.emersonprocess.com/education

Micro Motion Instrumentation Micro Motion, the pioneer in Coriolis technology and the world's leading producer of mass flow and density meters, offers classes at our factory, regional locations, or at your plant. Customized training at a customer's plant is a convenient, cost-effective means of training five to ten technicians. Also offering special technical training tools and materials for self-study.

Micro Motion Sensors and RFT9739 or 9739MVD Transmitter

Course 2351 CEUs: .7

This course is intended for anyone that is involved with properly installing, wiring, configuring and troubleshooting a Micro Motion Coriolis flow and density meter. Typical job functions include; maintenance technicians, instrument technicians and instrumentation engineers.

Overview

This 1-day course consists of a blend of lectures and hands-on exercises that cover the installation, configuration, calibration checks and troubleshooting of Micro Motion ELITE, F-Series and D sensors with the RFT9739 or 9739MVD transmitters and peripherals. This course includes hands-on exercises. Courses held at customer specified sites can be customized to address specific transmitters and configuration tools. Public registration classes cover a broad range of equipment based on the needs of the attendees.

Prerequisites

None required. However, basic understanding of the fundamentals of the behavior/properties of gases and gas density measurement are helpful. Basic electricity, analog & frequency signal processing knowledge are also assumed.

Topics

After attending this course the student will be able to do the following:

- Explain the Fundamentals for how a Micro Motion Coriolis Meter works and the Function of the Key Components
- Learn the Installation Best Practices for Orienting, Mounting and Wiring the Sensor and Transmitter
- Configure the RFT9739 or 9739MVD to Measure Flow, Density and Temperature for Their Application
- Learn a Step by Step Process to Perform Basic Troubleshooting of the Most Common Meter and Process Issues



Micro Motion Comprehensive Product Training

Course 2352 CEUs: 2.1

This class is intended for anyone that is involved with properly installing, wiring, configuring and troubleshooting a Micro Motion Coriolis flow and density meter. Typical job functions include; maintenance technicians, instrument technicians and instrumentation engineers.

Overview

This 3-day class consists of a blend of lectures and hands-on exercises that cover the installation, configuration, and calibration of the Micro Motion metering system. Students will learn the Series 1000/2000 transmitters using ProLink III, FC375, and the Series 3000 interface devices. Students will perform a master reset and use ProLink III to configure the Series 1000/2000, perform a flow calibration, and solve troubleshooting problems. On the third day, based on student need, we will cover one or all of the following topics: RFT9739 transmitter, T-Series, R-Series, Series 3000 platform, and IFT9701/9703 transmitters.

Prerequisites

None required. However, basic understanding of the fundamentals of flow measurement, electricity, analog & frequency signal processing are assumed.

Topics

- Explain the Fundamentals for how a Micro Motion Coriolis Meter Works and the Function of the Key Components
- Learn the Installation Best Practices for Orienting, Mounting and Wiring the Sensor and Transmitter
- Configure the Metering System to Measure Flow, Density and Temperature for Various Applications
- Learn a Step by Step Process to Perform Basic Troubleshooting of the Most Common Meter and Process Issues

Micro Motion Modbus Digital Communication

Course 2381 CEUs: .7

This course is appropriate for personnel who have any of the following responsibilities: Installing a Micro Motion transmitter on an RS-485 network, configuring, calibrating, operating, or troubleshooting a Micro Motion transmitter using Modbus protocol, setting up a Modbus host or PLC to communicate with a Micro Motion transmitter or writing programs that use Modbus protocol to communicate with Micro Motion transmitters.

Overview

This 1-day class consists of a blend of lectures and hands-on exercises. Students will learn the Modbus communications model, including RS-485 network requirements, memory structure, data types, functions, character framing, and message framing. Students will use Micro Motion's Modbus documentation set and Modbus tool to configure transmitter features, read process data, reset totals, read and acknowledge alarms, analyze diagnostic registers, zero the flowmeter, perform a loop test and manage a batch process. Troubleshooting will also be covered.

Prerequisites

Students should have completed Micro Motion Comprehensive Product Training, Course 2352, or have equivalent knowledge or experience.

Topics

- Explain the Fundamentals for the Modbus Protocol Model
- Configure, Commission, Read Process Data, View and Analyze Key Diagnostic Registers and Loop Test a Batch Application using a Micro Motion Meter
- Set up a Host System or PLC to Communicate with a Micro Motion Transmitter via Modbus

Micro Motion Series 1000/2000

Course 2358 CEUs: .7

This course is intended for anyone that is involved with properly installing, wiring, configuring and troubleshooting a Micro Motion Coriolis flow and density meter. Typical job functions include; maintenance technicians, instrument technicians and instrumentation engineers.

Overview

This 1-day course consists of a blend of lectures and hands-on exercises that cover the installation, configuration, calibration checks and troubleshooting of Micro Motion sensors with the Series 1000/2000 transmitters and peripherals. This course includes hands-on exercises. Courses held at customer specified sites can be customized to address specific transmitters and configuration tools. Public registration classes cover a broader range of equipment based on the needs of the attendees.

Prerequisites

None required. However, basic understanding of the fundamentals of flow measurement, electricity, analog & frequency signal processing are assumed.

Topics

- Explain the Fundamentals for how a Micro Motion Coriolis and Rosemount 8700 Series Magnetic flowmeter Work and the Function of the Key Components
- Be able to apply the installation best practices for orienting, mounting and wiring the sensor and transmitter.
- Configure the Metering System to Measure Available Process Variables from the Device for Their Application
- Learn a Step by Step Process to Perform Basic Troubleshooting of the Most Common Meter and Process Issues

Micro Motion 3098 Gas Specific Gravity

Course 2386 NEW CEUs: .7

This course is intended for anyone that is involved with properly installing, wiring, configuring and troubleshooting a Micro Motion 3098 Gas Specific Gravity meter. Typical job functions include; maintenance technicians, instrument technicians and instrumentation engineers.

Overview

This 1-day course consists of a blend of lectures and hands-on exercises that cover an overview of the operating principle, key components and applications of a 3098 Micro Motion Gas Specific Gravity meter. The process of commissioning a 3098 is covered including: installation, wiring, configuration and field calibration at initial startup. Troubleshooting of commonly seen issues is also covered. This course includes hands on demonstrations.

Prerequisites

None required. However, basic understanding of the fundamentals of the behavior/properties of gases and gas density measurement are helpful. Basic electricity, analog & frequency signal processing knowledge are also assumed.

Topics

- Explain the Principle of Operation for how a Micro Motion 3098 Gas Specific Gravity Meter Works and the Function of the Key Components
- Learn the Installation Best Practices for Orienting, Mounting, Piping and Wiring the 3098
- Configure the 3098 and Perform the Required Field Calibration
- Learn a Step by Step Process to Perform Basic Troubleshooting of the Most Common Issues Customers Encounter

Micro Motion Coriolis and Rosemount Smart Magnetic and Vortex Flowmeters

Course 2383 NEW CEUs: .7

This course is intended for anyone that is involved with installing, wiring, configuring -and troubleshooting a Micro Motion Coriolis, Rosemount 8700 Magnetic & 8800 Vortex flowmeters with a 775 Wireless THUM. Typical job functions include; maintenance technicians, instrument technicians and instrumentation engineers.

Overview

This 1-day course consists of a blend of lectures and hands-on exercises that cover a basic overview of wireless capabilities with a Micro Motion Coriolis, Rosemount 8700 Series Magnetic and 8800 Series Vortex meters. Based on customer need, the class can be taught for each individual products. The course provides a step by step process for the following: how to install and wire a 775 Smart Wireless THUM to each transmitter, how to configure the THUM, how to configure the 1420 Wireless Gateway to the THUM using AMS Device Manager , and how to add and view the Micro Motion and Rosemount transmitters to the gateway.

Prerequisites-

General understanding of the HART protocol and operation and configuration of a Micro Motion Coriolis, Rosemount 8700 Magnetic and 8800 Vortex meters is assumed.

Topics

- Explain the Fundamentals for how a Micro Motion Coriolis, Rosemount 8700 Series Magnetic & 8800 Series Vortex Flowmeters Work with a 1420 Wireless Gateway and 775 Smart THUM Adapter
- Install and Wire a 775 Smart THUM to Micro Motion and Rosemount Transmitters
- Connect to and Configure the Micro Motion and Rosemount Transmitters to work with a 1420 Wireless Gateway
- Configure a 775 Smart THUM and the Transmitters to Communicate on the Gateway using AMS Device Manager

To enroll in Micro Motion courses please call 800-338-8158 or 641-754-3771. For additional contact information refer to the appropriate contact on page 109. Updated dates & locations are available on our website at www.emersonprocess.com/education.

Micro Motion Coriolis and Rosemount Magnetic and Vortex Smart Flowmeters

Course 2380 NEW CEUs: .7

This class is intended for anyone that is involved with properly installing, wiring, configuring and troubleshooting a Micro Motion Coriolis and Rosemount Magnetic and Vortex flowmeters. Typical job functions include; maintenance technicians, instrument technicians and instrumentation engineers.

Overview

This 4-day class consists of a blend of lectures and hands-on exercises that cover the installation, configuration, and calibration of the metering system. Students will learn how to work on the Micro Motion Series 1000/2000 transmitters using ProLink III, HC475, and the Series 3000 interface devices the first two days. The 3rd day will cover the same topics for the Smart 8700 Magnetic flowmeter and on day 4 for the Smart 8800 Vortex flowmeter. Students will also learn the approach to uncover the most common problems encountered in the field and the troubleshooting techniques to correct them.

Prerequisites

None required. However, basic understanding of the fundamentals of flow measurement, electricity, analog & frequency signal processing are assumed.

Topics

- Explain the Fundamentals for how a Micro Motion Coriolis, Rosemount Magnetic and Vortex Flowmeters Work and the Function of the Key Components
- Learn the Installation Best Practices for Orienting, Mounting and Wiring the Sensor and Transmitter
- Configure the Metering System to Measure Available Process Variables from the Device for Their Application
- Learn a Step by Step Process to Perform Basic Troubleshooting of the Most Common Meter and Process Issues

Micro Motion Coriolis and Rosemount Smart 8700 Magnetic Flowmeters

Course 2384 NEW CEUs: 1.4

This course is intended for anyone that is involved with properly installing, wiring, configuring and troubleshooting a Micro Motion Coriolis and Rosemount Magnetic flowmeter. Typical job functions include; maintenance technicians, instrument technicians and instrumentation engineers.

Overview

This 2-day course consists of a blend of lectures and hands-on exercises that cover the installation, configuration, calibration checks and troubleshooting. Day 1 - Covers Micro Motion sensors with the Series 1000/2000 transmitters and peripherals. Day 2- covers the Rosemount Smart 8700 Series Magnetic flowmeter. This course includes hands-on exercises. Courses held at customer specified sites can be customized to address specific transmitters and configuration tools. Public registration classes cover a broader range of equipment based on the needs of the attendees.

Prerequisites

None required. However, basic understanding of the fundamentals of flow measurement, electricity, analog & frequency signal processing are assumed.

Topics

- Explain the Principle of Operation for how a Micro Motion Coriolis and Rosemount 8700 Series Magnetic Flowmeter Work and the Function of the Key Components
- Learn the Installation Best Practices for Orienting, Mounting and Wiring the Sensor and Transmitter
- Configure the Metering System to Measure Available Process Variables from the Device for Their Application
- Learn a Step by Step Process to Perform Basic Troubleshooting of the Most Common Meter and Process Issues

Micro Motion Coriolis and Rosemount Smart 8800 Vortex Flowmeters

Course 2387 NEW CEUs: 1.4

This course is intended for anyone that is involved with properly installing, wiring, configuring and troubleshooting a Micro Motion Coriolis and Rosemount Vortex flowmeter. Typical job functions include; maintenance technicians, instrument technicians and instrumentation engineers.

Overview

This 2-day course consists of a blend of lectures and hands-on exercises that cover the installation, configuration, calibration checks and troubleshooting. Day 1 - Covers Micro Motion sensors with the Series 1000/2000 transmitters and peripherals. Day 2- covers the Rosemount Smart 8800 Vortex flowmeter. This course includes hands-on exercises. Courses held at customer specified sites can be customized to address specific transmitters and configuration tools. Public registration classes cover a broader range of equipment based on the needs of the attendees.

Prerequisites

None required. However, basic understanding of the fundamentals of flow measurement, electricity, analog & frequency signal processing are assumed.

Topics

- Explain the Fundamentals for how a Micro Motion Coriolis and Rosemount Smart 8800 Vortex Flowmeter Work and the Function of the Key Components
- Learn the Installation Best Practices for Orienting, Mounting and Wiring the Sensor and Transmitter
- Configure the Metering System to Measure Available Process Variables from the Device for Their Application
- Learn a Step by Step Process to Perform Basic Troubleshooting of the Most Common Meter and Process Issues

Regulator Technologies, Regulators & Gas Control No other natural gas regulator manufacturer in the world offers more products and local services dedicated to safe, effective applications than Emerson Regulator Technologies. We have assumed the mantle of leadership in training the personnel of gas production, storage, pipeline, and distribution companies. Several courses covering the installation, troubleshooting, and adjustment of gas regulators and relief valves are available for gas regulator technicians at Regional Training Centers. Managers, engineers and technicians may wish to consider the Annual Gas Control Conferences. This 3-1/2 day event includes information from sizing and selection to troubleshooting.

Gas Regulator Technician

Course 1100 CEUs: 2.1

Overview

This 3-day course is designed primarily for technicians responsible for the installation and maintenance of regulators and relief valves. Emphasizing hands-on training, this course teaches students to install, troubleshoot, and adjust gas regulators and relief valves. Students who complete this course will be able to:

- perform maintenance on regulators and relief valves
- troubleshoot field problems

Prerequisites

At least one year field experience with gas regulators is recommended.

Topics

- Self-Operated Regulators
- Pilot-Operated Regulators
- Overpressure Protection
 - Series Regulation
 - Monitors
 - Slam Shut Options
 - Relief Valves
- Regulator Failure Analysis
- Troubleshooting



Gas Regulator Troubleshooting

Course 1106 CEUs: 2.1

This course is designed primarily for technicians with responsibility for installing, maintaining and troubleshooting gas regulators.

Overview

This 3-day course provides intensive hands-on training using the same regulators that are commonly used in the field. Actual gas regulator problems are simulated in the workshops, challenging the student to efficiently diagnose problems and restore the regulator to proper operation. Students who complete this course will:

- efficiently and safely troubleshoot common regulator operational performance problems
- understand the influence of the service environment on regulator performance
- understand the importance of correct installation procedures
- understand the role of correct sizing as it impacts regulator performance
- perform maintenance on regulators and relief valves
- troubleshoot field problems

Prerequisites

Gas Regulator Technician, Course 1100, or 2 years experience with regulators.

Topics

- Review Self and Pilot Operated Regulators Operating Principles
- Regulator Sizing Procedures
- Installation Practices
- Regulator Failure Analysis
- Regulator Stability
- Regulator Troubleshooting Principles and Procedures

Gas Control Conference

Course 8000 CEUs: 2.5

This conference is for those responsible for the selection, application and operation of regulators in the natural gas industry.

Overview This 3-1/2 day conference demonstrates the fundamentals of natural gas regulators in gas pressure control. This course emphasizes natural gas distribution and also covers natural gas transmission. Students who complete this conference will be able to:

- evaluate the difference between direct-operated and pilot-operated regulators
- evaluate the different methods of overpressure protection
- properly size regulators and relief valves for natural gas applications
- troubleshoot a wide variety of regulator types (Fisher products are used for general troubleshooting theory)

Prerequisites At least one year's experience in the field of natural gas regulators is recommended.

Topics

- Monitor Applications
 - Noise
 - Overpressure Protection
 - Pilot-Operated Regulators
 - Pressure Factor Measurement
 - Regulator Failure Analysis
 - Regulator Selection
 - Regulator Sizing
 - Regulator Stability
 - Self-Operated Regulators
 - Troubleshooting—Regulator Olympics*
- Department of Transportation (DOT) / Traffic Safety Institute (TSI) guest speakers provide guidelines and lead discussions on various design, operating, and maintenance requirements (49CFR192) as they apply to natural gas regulators.**

*The Regulator Olympics divides the class members into teams to participate in troubleshooting regulators—diagnosing district station problems, changing monitor modes, and working on commercial service regulators.

To enroll in Regulators and Gas Control courses please call 800-338-8158 or 641-754-3771. For additional contact information refer to the appropriate contact on page 109. Updated dates & locations are available on our website at www.emersonprocess.com/education.

Remote Automation Solutions, ROC & FloBoss Training for engineers and technicians using these flexible devices, which are widely used by natural gas production, pipeline, and distribution companies to measure and control gas flow, is scheduled regularly at regional training centers, and available elsewhere upon request.

ROC Engineering I

Course RA1200

CEUs: 3.2

This Remote Automation Solutions course is for engineers, technicians, and others involved in system operation and maintenance of ROC300 series products.

Overview

This 4-1/2 day course will provide an overall working knowledge of the ROC300 series (ROC364, ROC306, and ROC312) and an overview of Remote Automation Solutions products. Participants are presented with a comprehensive view of the ROC300 series hardware and software to obtain the necessary knowledge needed to effectively install, configure and maintain the ROC300 series products.

Each student will be provided with a PC (ROCLINK preinstalled), a Remote Automation Solutions RTU, a communications cable, and a workbook for the duration of the class

Prerequisites

Participants should have formal RTU configuration training and a working knowledge of their application/process. Participants should also have advanced PC knowledge and be thoroughly familiar with Microsoft Windows operating systems (XP or later versions).

Topics

- Overview of ROC300 Series
- Basic Concepts and Product Features
- Overview of ROCLINK 800 Software
- Configuring ROC300
- Basic Communications
- Maintaining and Troubleshooting
- Calibrating of AI and AO
- Basic FST Use

To arrange for training please call:
1-800-395-5497 or 860-945-2223



ROC and FloBoss Engineering II

Course RA1210

CEUs: 3.2

This Remote Automation Solutions course is an advanced course for experienced ROC and FloBoss users. Participants are typically engineers, technicians, and others with the responsibility for day to day operation and maintenance of the ROC and FloBoss products.

Overview

This 4-1/2 day course provides background and exercises that allow participants to learn effective implementation of the ROC364, ROC306/312, the FloBoss 407, the FloBoss 500. Items include hands-on lab work for connecting, configuring and troubleshooting hardware and software.

Each student will be provided with a PC (ROCLINK preinstalled), a Remote Automation Solutions RTU, a communications cable, and a workbook for the duration of the class

Prerequisites

Participants should have formal ROC/FloBoss configuration training and a working Knowledge of their application/process. Participants should also have advanced PC knowledge and be thoroughly familiar with Microsoft Windows operating systems (XP or later versions).

Topic Options Are:

- Overview of ROC300 Series
- Overview of FloBoss 407 and FloBoss 500
- FloBoss 407 Advanced Concepts
 - General Operation
 - Managing Flash Memory (User Programs)
 - MVS Operation, Multi-Dropping and Temperature Calibration
- ROC/HART
 - HART Basics
 - Connecting/Configuring the MVS Point to Point & Multi-Drop HART Instruments/
- ROC/Modbus Configuration
 - Communications Basics
 - RS232, RS485/RS422 Basics and Lab
 - Dialup Communication Basics and Lab
- FST Guidelines

To arrange for training please call:
1-800-395-5497 or 860-945-2223

ROC and FloBoss Troubleshooting and Problem Solving

Course RA1217

CEUs: 2.1

This Remote Automation Solutions course is designed to provide FloBoss and ROC users with a broad experience in troubleshooting and field repair of the ROC and FloBoss products.

Overview

This 3-day course teaches the participant how to identify problems, determine the causes and take the proper corrective action for a quick resolution for the FloBoss 400/500 series and the ROC 300 series products. In this lab intensive course, stations will be set up with faulty equipment and participants will be challenged to identify and correct errors and malfunctions. The lab stations include common and not so common problem scenarios that have been collected from our field support group and from the factory repair department.

Each student will be provided with a PC (ROCLINK preinstalled), a Remote Automation Solutions RTU, a communications cable, and a workbook for the duration of the class

Prerequisites

Participants should have formal ROC/FloBoss configuration training and a working Knowledge of their application/process. Participants should also have advanced PC knowledge and be thoroughly familiar with Microsoft Windows operating systems (XP or later versions).

Topics

- ROC 300 Series Hardware Overview
- FloBoss 407/500 Hardware Overview
- Configuration Software Review
- Troubleshooting Procedures and Plans
- Planning Maintaining Schedules
- Problem Prevention

This course is available on request for customers having a minimum # of participants (normally 4).

To arrange for training please call:
1-800-395-5497 or 860-945-2223

FloBoss Configuration and Operations

Course RA1220 CEUs: 3.2

This Remote Automation Solutions course is for engineers, technicians, and others involved with the configuration and operation of the FloBoss 103 and FloBoss 107 products.

Overview

This 4-1/2 day course will provide an overall working knowledge of the FloBoss 103, FloBoss 107 and the FloBoss 107E. Participants are presented with a comprehensive view of the FloBoss 103/107/107E hardware and software to obtain the necessary knowledge needed to effectively install, configure and maintain the FloBoss 103/107/107E products.

Each student will be provided with a PC (ROCLINK preinstalled), a Remote Automation Solutions RTU, a communications cable, and a workbook for the duration of the class

Prerequisites

Participants should have a working knowledge of their application/process and should also have advanced PC knowledge and be thoroughly familiar with Microsoft Windows operating systems (XP or later versions).

Topics

- FloBoss 103/107/107E Hardware Overview
- Flow Measurement Review
 - Overview on MVS Product
 - Set Up Multi-Dropping on MVS
- FloBoss Configuration
 - Elements of a Basic Configuration
 - Setting and Checking ROC System Flags
 - Set and Check ROC Information
 - Configuring I/O Points
 - Calibrating AI and AO points
 - Communication Basics
 - Configuring AGA Flow Calculations
 - Configuring FloBoss History
 - Building FloBoss Displays
- FST Basics Workshop

To arrange for training please call:
1-800-395-5497 or 860-945-2223

ROC800 Series

Course RA1240 CEUs: 3.2

This Remote Automation Solutions course is for engineers, technicians, and others involved with the operation and maintenance of the ROC800 Series products.

Overview

This 4-1/2 day course will provide an overall working knowledge of the ROC800 series. Participants are presented with a comprehensive view of the ROC809/827 hardware and software to obtain the necessary knowledge needed to effectively install, configure and maintain the ROC800 series products.

Each student will be provided with a PC (ROCLINK preinstalled), a Remote Automation Solutions RTU, a communications cable, and a workbook for the duration of the class

Prerequisites

Participants should have a working knowledge of RTUs and hardware associated with RTUs and should also have advanced PC knowledge and be thoroughly familiar with Microsoft Windows operating systems (XP or later versions).

Topics

- ROC800 Series Hardware Overview
- Flow Measurement Review
 - Overview on MVS Product
 - Setup Multi-Dropping on MVS
- Introduction to ROCLINK 800 Software
- ROC809/827 Configuration
 - Elements of a Basic Configuration
 - Setting and Checking ROC System Flags
 - Set and Check ROC Information
 - Configuring I/O Points/
 - Calibrating AI and AO Points
 - PID Configuration
 - Communication Basics
 - Configuring AGA Flow Calculations
 - Configuring ROC800 History
 - Building ROC800 Displays
- FST Basics Workshop

To arrange for training please call:
1-800-395-5497 or 860-945-2223

DS800 for ROC800 Series Programming

Course RA1241 CEUs: 2.1

This Remote Automation Solutions course is for engineers, technicians, and others involved with configuring the ROC800 Series products.

Overview

This 3-day course will provide an overall working knowledge of the 5 different programming languages for the ROC800 series. The course emphasizes hands-on exercises using DS800 Development Suite to program the ROC800 Series Products.

Each student will be provided with a PC (ROCLINK & DS800 preinstalled), a Remote Automation Solutions RTU, a communications cable, and a workbook for the duration of the class

Prerequisites

Participants should have experience with ROC800 series hardware, a working knowledge of their application/process and should also have advanced PC knowledge and be thoroughly familiar with Microsoft Windows operating systems (XP or later versions).

Topics

- DS800 Software Overview
 - Sequential Function Chart
 - Ladder Logic of Ladder Diagram
 - Function Block Diagram
 - Structured Text
 - Instruction List
- ROCLINK 800 Software

To arrange for training please call:
1-800-395-5497 or 860-945-2223

To enroll in Remote Automation Solutions courses call 800-395-5497 or 860-945-2223. For additional contact information refer to the appropriate contact on page 109. Updated dates & locations are available on our website at www.emersonprocess.com/education.

DL8000 Preset System Configuration

Course RA1242 CEUs: 2.1

This Remote Automation Solutions course is for engineers, technicians, and others involved with the operation and maintenance of the DL8000 Preset System Controller product.

Overview

This 3-day course will provide an overall working knowledge of the DL8000 Preset System Controller. Participants will be enabled to configure, operate and diagnose the DL8000 Preset System Controller.

Each student will be provided with a PC (ROCLINK preinstalled), a Remote Automation Solutions RTU (DL8000), a communications cable, and a workbook for the duration of the class.

Prerequisites

Participants should have formal RTU configuration training preferably with ROC800 series hardware and a working knowledge of their application/process. Participants should have advanced PC knowledge and be thoroughly familiar with Microsoft Windows operating systems (2000/XP or later versions).

Topics

- Basic Concepts and Product features of the DL8000
- Set Up Parameters
- Meter Proving
- Hardware diagnostics and Troubleshooting
- DL8000 Configuring Dynamic, Real-Time Display of Flow Parameters
- Configuring for Additive Injection
 - Temperature Compensation
 - Data Logging
 - Communications
- Blending Methods and Flow Sequencing

To arrange for training please call:
1-800-395-5497 or 860-945-2223

ROC800L Configuration

Course RA1244 CEUs: 1.8

This Remote Automation Solutions course is for engineers, technicians, and others involved with the operation and maintenance of the ROC800L.

Overview

This 2-1/2 day course will provide an overall working knowledge of the ROC800L. Participants are presented with a comprehensive view of the ROC800L hardware and software to obtain the necessary knowledge and practice needed to install and configure a ROC800L. Participants will know the differences between the ROC809 and ROC800L.

Each student will be provided with a PC (ROCLINK preinstalled), a Remote Automation Solutions RTU (ROC800L), a communications cable, and a workbook for the duration of the class.

Prerequisites

Participants should have formal RTU configuration training and a working knowledge of their application/process. Participants should have advanced PC knowledge and be thoroughly familiar with Microsoft Windows Operating Systems (XP or later versions).

Topics

- Basic Concepts and Product features
- Install and configure a ROC800L RTU
- Convert ROC800 to RO800L
- Configuring an Application
- Updating Firmware and Software

To arrange for training please call:
1-800-395-5497 or 860-945-2223



Remote Automation Solutions, ControlWave

Emerson Process Management, the leading global supplier of flow computers, SCADA RTUs and presets, is the single source for all your needs from field equipment to the business system. We provide the industry-specific expertise and training in oil and gas, water and wastewater, along with best-in-class products to help you achieve peak financial performance and long-term sustainability.



ControlWave® Configuration

Course RA331 CEUs: 1.8

Field personnel whose responsibilities may include: installation, wiring, start-up, troubleshooting, configuration, or maintenance of the ControlWave products.

An individual who seeks a more thorough understanding of the ControlWave products

Overview

This 2-1/2 day hands-on course covers the hardware, configuration and maintenance of the ControlWave product family.

This course will equip you with the necessary knowledge and practice needed to configure the ControlWave hardware for communications. Learn how to troubleshoot and utilize software application programs to perform diagnostics and monitor live data and communication statistics.

Prerequisites

- Participants should have formal instrument technician training and a working knowledge of their application/process
- Participants must be thoroughly familiar with Windows XP or later versions

Topics

- Overview of ControlWave Hardware
- Overview of OpenBSI Software Utilities
- Basic Troubleshooting
- Basic ControlWave Configuration

To arrange for training please call:
1-800-395-5497 or 860-945-2223

Network Communications and Troubleshooting

Course RA423 CEUs: 1.8

System Engineers who are responsible for installing and configuring the OpenBSI software for SCADA

Overview

This 2-1/2 day hands-on course covers the hardware, network configurations, and network tuning in a OpenBSI network of RTUs and measurement devices.

This course will equip you with the necessary knowledge and practices needed to optimize network communications. Learn how to troubleshoot and make necessary configuration adjustments using OpenBSI application programs, monitor live data, perform diagnostics and communication statistics.

Prerequisites

- Successful completion of the ControlWave Designer Fundamentals course
- Participants should have a working knowledge of their application/process
- Participants must be familiar with Windows XP or later versions

Topics

- Overview of OpenBSI Software Utilities
- BSAP Protocol Message Structure
- ControlWave Designer Communications System Variables
- Hands-On Communications Troubleshooting

To arrange for training please call:
1-800-395-5497 or 860-945-2223

ControlWave® Designer Programming Short Course

Course RA440 CEUs: 1.8

A hands-on course that will give you as much exposure to ControlWave programming as possible in the shortest amount of time.

Overview

The ControlWave Designer short 2-1/2 day course provides the knowledge and skill required to define and control inputs and outputs of related real world applications, including basic communications and troubleshooting. The class project will help students generate and debug simple control strategy programs using Function Block, Ladder Logic, and Structured Text programming languages, including programming for Modbus communications

Prerequisites

- Participants must have a strong working knowledge of personal computers and Windows XP or a later version
- Participants should have a strong working knowledge of their application/process • Participants should have programming experience (this course is not recommended for beginning programmers)
- Participants should have completed "Creating a Simple Project"

Topics

- Understand How IEC-61131-3, ControlWave Designer and On-Line Utilities Work
- Master Skills Necessary to Create a Program for ControlWave Controllers
- Learn the Bristol Library of Function Blocks for Measurement, Calculations, Process Control, Data Storage
- Understand OpenBSI Communications Software
- Master How to Establish Ethernet/IP Communications using ControlWave Designer
- Learn to Program Polling and Data Transfers in BSAP and an I/O Environment
- Understand How to Define a Hierarchical Network of ControlWave Controllers using NetView
- Understand the Configuration of Communication via other Protocols such as --Modbus

To arrange for training please call:
1-800-395-5497 or 860-945-2223

To enroll in Remote Automation Solutions courses call 800-395-5497 or 860-945-2223. For additional contact information refer to the appropriate contact on page 109. Updated dates & locations are available on our website at www.emersonprocess.com/education.

ControlWave® Designer Fundamentals

Course RA441 CEUs: 3.2

Personnel responsible for programming and debugging in ControlWave Designer

Overview

A 4-1/2 day hands-on course for programming the ControlWave product family using the Designer IEC-61131-3 standard software and the ControlWave function block library. This course will provide you the necessary knowledge and skills required to define and control inputs and outputs of related real world applications.

Students will generate and debug simple control strategy programs using Function Block, Ladder Logic, Structured Text, and Sequential Function Chart programming. They will also learn the basics of ControlWave communications, historical data storage, alarming, and hardware configurations, and much more.

Prerequisites

- Participants must have a strong working knowledge of personal computers and Windows XP or later versions
- Participants should have a strong working knowledge of their application/process

Topics

- Ladder Logic
- Structured Text
- Function Block Diagram
- Sequential Function Chart
- Creating User Function Blocks

To arrange for training please call:
1-800-395-5497 or 860-945-2223

ControlWave® Designer Communications Programming

Course RA442 CEUs: 3.2

Personnel responsible for the establishing of communication interfaces to ControlWave Automation products

Overview

This 4-1/2 day course is a continuation of ControlWave Designer Fundamentals, this course focuses on networking and communications. Students will program the ControlWave to communicate to other devices in a network, as well as transfer and receive signal lists using serial and IP communications. Other application software will be utilized to configure, establish, and debug communications with these devices.

Students will learn the advanced methods of communicating to Bristol and ControlWave devices using Client/Server modules, and to MODBUS protocol devices using custom function blocks.

Prerequisites

- Successful completion of course #441, ControlWave Designer Fundamentals
- Participants must have a strong working knowledge of personal computers and Windows XP or later version
- Participants should have a strong working knowledge of their application/process

Topics

- Client/Server Function Blocks
- MODBUS
- System Communication Variables
- BSAP Network Communications

To arrange for training please call:
1-800-395-5497 or 860-945-2223

ControlWave® Designer Accelerated Programming

Course RA443 CEUs: 3.2

Personnel responsible for the establishing of communication interfaces to ControlWave Automation products

Overview

Save time and costs by attending a fast-paced, hands-on 4-1/2 day course for programming the ControlWave product family using IEC-61131-3 standard software and Bristol®-supplied functions. Combining the ControlWave Designer Communications Programming and Fundamentals courses allows you to participate in a single one week course. This course will provide you with the knowledge and skills required to define and control inputs and outputs of related real world applications, including communications and troubleshooting.

Students will generate and debug simple control strategy programs using Function Block, Ladder Logic, Structured Text, and Sequential Function Chart programming while learning the basics of ControlWave network communications, historical data storage, alarming, and hardware configurations - including MODBUS communications.

Prerequisites

- Participants must have a strong working knowledge of personal computers and Windows XP or a later version
- Participants should have a strong working knowledge of their application/process
- Participants should have some programming experience
- Participants should have completed "Creating a Simple Project"

Topics

- Basic IEC-61131-3 Programming
- Creating User Function Blocks
- Archive/Audit Trail
- BSAP Communications
- MODBUS

To arrange for training please call:
1-800-395-5497 or 860-945-2223

ControlWave® Gas Measurement Products

Course RA445 CEUs: 1.8

Personnel responsible for the installation, wiring, start-up, configuration and maintenance of ControlWave gas flow computers

Overview

The ControlWave Gas Measurement 2-1/2 day course provides students with a thorough understanding of configuring the ControlWave® GFC, EFM, and XFC Flow Computers for single or multiple-run gas measurement.

As a hands-on course, students will use TechView to collect historical logs, calibrate internal and external pressure sensors, and gain troubleshooting techniques for real world applications.

Prerequisites

The following are suggested, not mandatory:

- Participants should have a working knowledge of their application/process
- Participants should be familiar with Windows XP or later versions and possess a general knowledge of gas measurement and production

Topics

- Hardware Configuration
- TechView Software Overview
- Log Collection
- Troubleshooting
- Configuring 4-Run Gas Application

To arrange for training please call:
1-800-395-5497 or 860-945-2223

Station Manager Configuration

Course RA447 CEUs: 1.8

Personnel responsible for the installation, wiring, start-up, configuration and maintenance of ControlWave gas flow computers

Overview

The Gas Measurement Applications for Technicians 2-1/2 day course provides students with a thorough understanding of configuration of the Station Manager application for the ControlWave Micro.

Students will use TechView to configure the ControlWave application to establish multiple gas measurement and control scenarios, historical log collections, calibrations, and much more.

Prerequisites

The following are suggested, not mandatory:

- Participants should have a working knowledge of their application/process
- Participants should be familiar with Windows XP or later versions and possess a general knowledge of gas measurement and production

Topics

- Hardware Overview
- Writing/Saving Configurations
- I/O Controls
- MVT Calibration
- Station Configuration

To arrange for training please call:
1-800-395-5497 or 860-945-2223

OpenEnterprise for SCADA Systems - Basics, Level I

Course RA701 CEUs: 3.2

The class is intended for users who have experience with programming and configuration of Bristol RTUs.

Overview

This 4-1/2 day course provides a very brief introduction to the OpenEnterprise Server, and more detailed coverage of the OpenEnterprise Workstation and OpenEnterprise Reporting packages (version 2.80).

At the conclusion of the Class, students will be able to install a very simple OpenEnterprise Server and Workstation; configure communications with Bristol RTU's and then begin building HMI displays, trends, alarm windows, and develop a basic user interface using these products.

Prerequisites

- Participants must have a strong working knowledge of personal computers and Windows 2000/ XP or a later version
- Participants must have a strong working knowledge of their application/ process
- Participants should have a strong working knowledge of Open BSI and ControlWave Designer

Topics

- Database Explorer and structure
- Creating display objects
- Alarm Windows, and Alarm & Event History
- Creating and Configuring Trends
- Data Export
- Creating Reports
- System Troubleshooting

To arrange for training please call:
1-800-395-5497 or 860-945-2223

To enroll in Remote Automation Solutions courses call 800-395-5497 or 860-945-2223. For additional contact information refer to the appropriate contact on page 109. Updated dates & locations are available on our website at www.emersonprocess.com/education.

OpenEnterprise for SCADA Systems - Intermediate, Level II

Course RA702 CEUs: 3.2

This class is intended for engineers who will be designing and building complete OpenEnterprise systems.

Overview

This 4-1/2 day course will equip you to be able to install an OpenEnterprise Server and Workstation; configure the communications, security, historical, alarming, messaging and other major subsystems. Most of the tools within the OpenEnterprise toolbox will be covered during this class.

Prerequisites

- Participants should have formal RTU configuration training and a working knowledge of their application/process
- Participants must be thoroughly familiar with Windows 2000/ XP or later versions
- Participants should have advanced PC and networking skills
- Participants must have completed the Basic OpenEnterprise Class course #701

Topics

- Learn Advanced Configurations of the OpenEnterprise Systems
- Perform Alarming and Messaging Configurations
- Learn to Configure, Diagnose and Troubleshoot OpenEnterprise Systems
- Creating Calculations from RTU Data

Config S600+ Pro

Course RA901 CEUs: 3.2

The Config600 Pro course is aimed at application engineers and system integrators who design and develop FloBoss S600+ applications for integration with metering systems and skids.

Overview

The 4-1/2 day Config600 Pro course provides an insight into the generation of application configurations for the FloBoss S600+.

The course will include a mixture of input from the trainer and participative training involving work in pairs and as individuals.

All attendees will be supplied with a Config600 Pro license, electronic copies of all documentation and Config600 Pro release CD's (including PDF copies of marketing materials).

Prerequisites

- Participants should have completed the online familiarization course and be familiar with metering techniques and standards
- Participants should bring their own laptop computers to the course and should preferably have administrator privileges
- Participants must be PC literate
- Participants should have the Config600+ application installed on their laptop prior to attending – Note: this must not be installed more than 1 week prior to the course as the evaluation license expires after 14 days
- Participants should have an appreciation of computer programming languages

Topics

- Basic Concepts and Product Architecture
- Install and configure S600+ Applications
- S600+ Database Structure and Commonly used Features
- Create and Configure Displays/Reports/ Modbus Interfaces

S600+ Operator

Course RA902 CEUs: 3.2

The FloBoss S600+ Operator course provides an overview into the hardware and operational aspects of the FloBoss S600+.

Overview

The 4-1/2 day course will include a mixture of input from the trainer and participative training involving work in pairs and as individuals.

Prerequisites

- Participants should be familiar with metering techniques and standards
- Participants should bring their own laptop computers to the course and should preferably have administrator privileges
- Participants must be PC literate
- Participants should have the Config600 Lite application installed on their laptop prior to attending

Topics

- Basic Concepts and Product Architecture
- Hardware/IO Capabilities
- Download and Upload S600+ Configurations
- Use of the Front Panel I and Web Browser Capabilities
- Use of the Config600 Lite Tool to Modify Existing Displays/Reports/Modbus Interfaces

Gas Analyzers

With a wide selection of sensors, analyzers, gas chromatographs, and other measurement and analysis technologies, Rosemount Analytical helps customers streamline process performance with innovative improvements that increase throughput, minimize energy usage, maximize asset life, and take advantage of continuous online diagnostics for amazing results.

951C Chemiluminescence Analyzer

Course 2102

Overview

This 1-day course uses lectures and hands-on service training to instruct the student on how to install and maintain the Rosemount Analytical Model 951C Chemiluminescence Analyzer. Students will:

- identify subassemblies and explain their functionality
- explain the principles of operation
- calibrate and test
- properly install and troubleshoot

Topics

- 951C Overview and Principles of Operation
- Test Equipment Selection
- Bench Testing the 951C
- Calibrating the 951C Chemiluminescence Analyzer
- Installation and Start-Up
- Troubleshooting and Maintenance

Available on Request in Houston, TX, Solon, OH, or at Customer Site

Continuous Emissions Monitoring Systems (CEMS)

Course 2157

This course is for instrument technicians responsible for the maintenance of continuous emissions monitoring systems.

Overview

This 3-day course covers basic fundamentals and the theory of operation, installation, calibration and maintenance of continuous emissions monitoring systems.

Topics

- Environmental Requirement
- Process Applications
- Theory of Operation
- Sample System Instrument
 - Installation and Troubleshooting
 - Hardware and Maintenance

Available on Request in Houston, TX, Solon, OH, or at Customer Site

NGA 2000 Process Gas Analyzers

Course 2107

Overview This 5-day course consists of 1-day per selected analyzer:

- NGA Platform
- NGA FID
- NGA CLD
- NGA HFID
- NGA WCLD

Lectures and hands-on service training are provided on how to install, maintain, and troubleshoot the NGA series of analyzers. Students who complete this course will:

- identify individual modules and their functionality
- understand the basic theory of operation of each module
- set up software variables for proper calibration and operation
- understand and properly use software diagnostics

Topics

- NGA Overview
- NGA as a System
- NGA Testing
- NGA Start-Up and Installation

Available on Request in Houston, TX, Solon, OH, or at Customer Site

400A Hydrocarbon Analyzer

Course 2103

Overview This 1-day course uses lectures and hands-on service training to instruct the student on how to install and maintain the Rosemount Analytical Model 400A Hydrocarbon Analyzer. Students will:

- identify subassemblies/explain functionality
- explain the principles of operation
- calibrate and test
- properly install and troubleshoot

Topics

- 400A Overview and Principles of Operation
- Test Equipment Selection
- Bench Testing the 400A
- Calibrating the 400A Hydrocarbon Analyzer
- Installation and Start-Up
- Troubleshooting and Maintenance

Available on Request in Houston, TX, Solon, OH, or at Customer Site

MLT Process Gas Analyzers

Course 2110

Overview

This 3-day course uses lectures and hands-on service training to provide instruction on MLT analyzers, platforms, and other menu structures. The course will teach the student on how to install, maintain, and troubleshoot the MLT series of analyzers. Application and selection will be briefly covered including the hazardous area requirements. Students will:

- identify modules and their functionality
- understand the basic theory of operation
- set up software variables for proper calibration and operation
- use the software diagnostics to troubleshoot problems

Topics

- Overview of MLT
- Theory of Operation
- Installation
- Configuration and Calibration
- Maintenance and Troubleshooting

Location

Solon, OH

BINOS/OXYNOS/HYDROS Analyzers

Course 2113

Overview

This 3-day course familiarizes the student with the non-dispersive infrared, electrochemical oxygen, paramagnetic oxygen, and thermal conductivity measurement techniques used in the BINOS, OXYNOS, and HYDROS gas analyzers. Maintenance and troubleshooting are covered in detail. Typical applications and start-up procedures are also discussed.

Topics

- Objectives
- Theory
- Installation
- Troubleshooting
- Maintenance

Offered on Request at Customer Site

To enroll in Rosemount Analytical courses please call 713-396-8771. For additional contact information refer to the appropriate contact on page 109. Updated dates & locations are available on our website at www.emersonprocess.com/education.

Oxygen Flue Gas Analyzer Maintenance including Oxymitter, and World Class 3000**Course 2153****Overview**

This 1-day course covers the service requirements for oxygen analyzers in general and the installation, operation, calibration and maintenance of the World Class and Oxymitter.

Topics

- Combustion Requirements
- Methods of Oxygen Analysis
- Typical Uses of Oxygen Analysis
- Combustion Efficiency
- Zirconia (ZrO_2) Oxygen Analysis
- Theory of Operation
- Oxygen Analyzer: Installation; Hardware; Maintenance; Troubleshooting; Hart Communications

Offered on Request at Customer Site

X-STREAM Process Gas Analyzers**Course 2170****Overview**

This 3-day course uses lectures and hands-on training to teach the student the non-dispersive infrared, electrochemical, or paramagnetic oxygen and thermal conductivity measurement techniques used in the analyzer. Applications will be reviewed including the various housings to meet the environmental needs. The student will:

- learn the theory of operation
- set up software variables for proper calibration and installation
- understand and use the troubleshooting tools including diagnostics

Topics

- Overview and Theory
- Application and Selection of Options
- Installation and Troubleshooting
- Maintenance and Calibration

Available on Request in Solon, OH, or at Customer Site

OPM 3000/4000 - Opacity Monitor Maintenance**Course 2169**

Overview This 2-day course is a combination of labs and lectures and hands-on service training combined with the objective of teaching the theory and operation of the opacity monitor. Product application will be reviewed. Correct selection of equipment, installation, and start up are critical and will be covered in detail. Operational diagnostics and maintenance are explored with the goal of allowing the student to recognize and correct any issues promptly. EPA certification and quarterly audits will be discussed, but in depth planning will be site-specific.

Topics

- Overview of the Opacity Monitor
- Theory of Operation
- Installation and Start Up
- Troubleshooting and Maintenance
- Audit and Reporting Requirements

Available on Request in Houston, TX, Solon, OH, or at Customer Site

CCO 5500 CO Analyzer Maintenance**Course 2168****Overview**

This 1-day course covers the theory, application and operation of the CCO5500. Infrared absorption spectroscopy is defined and explained as a measurement technique. Focusing on applications, the instrument is reviewed and the students are taught to install and maintain the analyzer. Students will:

- understand the basic theory of operation
- learn to install and start up the analyzer including calibration
- use the software diagnostics to troubleshoot problems

Topics

- Overview of the CCO 5500, Carbon Monoxide Analyzer
- Theory of Operation, Appropriate Applications
- Installation, Configuration, and Calibration
- Troubleshooting and Maintenance

Available on Request in Houston, TX, Solon, OH, or at Customer Site

Online Safety Training for Process Gas Analyzers**Course 2171****Overview**

This fully customized 5-day course provides students with a strong understanding of gas analyzer best practices as they relate to the safe operation and maintenance of the specific model(s) of Rosemount Analytical gas analyzers found in their plants, including the NGA2000, MLT, Binos, CLD, X-STREAM, and X-STREAM XE. The instructor focuses on the specific analyzers that are applicable to the students' specific needs. This course emphasizes safe handling of Rosemount Analytical analyzers. All necessary equipment and important handouts will be provided.

Topics

- Analyzer Overview, Including Hardware and Construction
- Software Functionality
- Physical Principals of IR and UV Photometric Measurements and Oxygen Paramagnetic Measurements
- Overview of the Electronics
- Replacement of Physical Components
- Testing and Troubleshooting
- Spare Parts
- Mechanical Assembly/Disassembly
- Sample Handling System – Method, Theory, and Troubleshooting
- Site-specific Applications
- Theory of Operation
- Installation and Start Up
- Troubleshooting and Maintenance
- Audit and Reporting Requirements

Available on Request in Houston, TX, Solon, OH, or at Customer Site

Gas Chromatographs

With a wide selection of sensors, analyzers, gas chromatographs, and other measurement and analysis technologies, Rosemount Analytical helps customers streamline process performance with innovative improvements that increase throughput, minimize energy usage, maximize asset life, and take advantage of continuous online diagnostics for amazing results.

ROSEMOUNT
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Introduction to Model 500 and 700 Gas Chromatographs

Course R4100

Overview

This 3-day course provides students with a basic understanding of how a gas chromatograph works, emphasizing chromatograph fundamentals and basic theory.

Topics

- Reviewing Basic Chromatography Principles
- Understanding Chemistry, Flow Configuration, and Gas Systems
- Understanding Basic Sample Systems
- Working with Chromatograph Hardware
- Setting Timed Events, Retention Times, and Response Factors
- Understanding Data Calculations
- Identifying Problems Using Chromatograms

Available On Request in Houston, TX or On-Site

Classes typically start at 1 pm on Monday and end at 12 pm on Wednesday to accommodate travel.

Introduction to 700XA and 1500XA Gas Chromatographs

Course R4105

Overview

This 3-day course gives students a basic understanding of how a 700XA and 1500XA gas chromatograph works, emphasizing chromatograph fundamentals and basic theory.

Topics

- Reviewing Chromatography Principles
- Understanding Chemistry, Flow Configuration, and Gas Systems
- Reviewing Sample Systems
- Working with Chromatograph Hardware
- Setting Timed Events, Retention Times, and Response Factors
- Understanding Data Calculations
- Reading Chromatograms
- Calibrating a Gas Chromatograph

Available On Request in Houston, TX or On-Site

Classes typically start at 1 pm on Monday and end at 12 pm on Wednesday to accommodate travel.

Operation and Maintenance of Model 500 Gas Chromatographs

Course R4210

Overview

This 5-day course is appropriate for those who have either worked with a chromatograph for at least six months or completed the 'Introduction to Gas Chromatographs' course. It prepares participants to operate and repair a Model 500 gas chromatograph.

Prerequisites

'Introduction to Gas Chromatographs' course or equivalent knowledge.

Topics

- Understanding Gas Chromatography and a Gas Chromatograph
- Using the Basic Chromatograph System in Process Gas Analysis
- Understanding Carrier and Calibration Gas Systems
- Installing and Operating MON Software
- Applying Chromatograph Integration Techniques and Post-Analysis Calculations
- Using the Chromatograph to Identify Problems
- Setting Timed Events, Retention Times, and Response Factors
- Starting Up a Gas Chromatograph
- Understanding Sample Handling Systems
- Verifying Proper Operation of the Gas Chromatograph
- Troubleshooting the 2350A Controller
- Configuring the 2350A Controller User Directory Outputs
- Conducting Preventative Maintenance
- Communicating to Other Devices
- Reviewing Spare Parts Recommendations

Available On Request in Houston, TX or On-Site

Classes typically start at 1 pm on Monday and end at 12 pm on Friday to accommodate travel.

Operation and Maintenance of Model 700 Gas Chromatographs

Course R4212

Overview

This 5-day course is appropriate for those who have either worked with a chromatograph for at least six months or completed the 'Introduction to Gas Chromatographs' course. It prepares participants to operate and repair a Model 700 gas chromatograph.

Prerequisites

'Introduction to Gas Chromatographs' course or equivalent knowledge.

Topics

- Understanding Gas Chromatography and a Gas Chromatograph
- Using the Basic Chromatograph System in Process Gas Analysis
- Understanding Carrier and Calibration Gas Systems
- Installing and Operating MON Software
- Applying Chromatograph Integration Techniques and Post-Analysis Calculations
- Using the Chromatograph to Identify Problems
- Setting Timed Events, Retention Times, and Response Factors
- Starting Up a Gas Chromatograph
- Understanding Sample Handling Systems
- Verifying Proper Operation of the Gas Chromatograph
- Conducting Preventative Maintenance
- Communicating to Other Devices
- Reviewing Spare Parts Recommendations

Available On Request in Houston, TX or On-Site

Classes typically start at 1 pm on Monday and end at 12 pm on Friday to accommodate travel.

To enroll in Rosemount Analytical courses please call 713-396-8771. For additional contact information refer to the appropriate contact on page 109. Updated dates & locations are available on our website at www.emersonprocess.com/education.

Operation and Maintenance of the 700XA Gas Chromatographs**Course R4213****Overview**

This 5-day course is appropriate for those who have either worked with a chromatograph for at least six months or completed the 'Introduction to Gas Chromatographs' course. It prepares participants to operate and repair a 700XA gas chromatograph.

Prerequisites

'Introduction to Gas Chromatographs' course or equivalent knowledge.

Topics

- Understanding Gas Chromatography and a Gas Chromatograph
- Using the Basic Chromatograph System in Process Gas Analysis
- Understanding Carrier and Calibration Gas Systems
- Installing and Operating MON Software
- Applying Chromatograph Integration Techniques and Post-Analysis Calculations
- Using the Chromatograph to Identify Problems
- Setting Timed Events, Retention Times, and Response Factors
- Starting Up a Gas Chromatograph
- Understanding Sample Handling Systems
- Verifying Proper Operation of the Gas Chromatograph
- Conducting Preventative Maintenance
- Communicating to Other Devices
- Reviewing Spare Parts Recommendations

Available On Request in Houston, TX or On-Site

Classes typically start at 1 pm on Monday and end at 12 pm on Friday to accommodate travel.

Operation and Maintenance of the 1500XA Gas Chromatographs**Course R4214****Overview**

This 5-day course is appropriate for those who have either worked with a chromatograph for at least six months or completed the 'Introduction to Gas Chromatographs' course. It prepares participants to operate and repair a 1500XA gas chromatograph.

Prerequisites

'Introduction to Gas Chromatographs' course or equivalent knowledge.

Topics

- Understanding Gas Chromatography and a Gas Chromatograph
- Using the Basic Chromatograph System in Process Gas Analysis
- Understanding Carrier and Calibration Gas Systems
- Installing and Operating MON Software
- Applying Chromatograph Integration Techniques and Post-Analysis Calculations
- Using the Chromatograph to Identify Problems
- Setting Timed Events, Retention Times, and Response Factors
- Starting Up a Gas Chromatograph
- Understanding Sample Handling Systems
- Verifying Proper Operation of the Gas Chromatograph
- Conducting Preventative Maintenance
- Communicating to Other Devices
- Reviewing Spare Parts Recommendations

Available On Request in Houston, TX or On-Site

Classes typically start at 1 pm on Monday and end at 12 pm on Friday to accommodate travel.



Advanced Process Model 500 and 700 Gas Chromatographs**Course R4311****Overview**

This 5-day course is most valuable to those with three years of chromatography experience, or those who have completed the introductory 'Operation and Maintenance of Gas Chromatographs' course. Participants will develop an advanced understanding of gas chromatograph operation, troubleshooting, and maintenance. Training becomes customized when students present application information. Given that data, the experience instructor will look closely at specific applications and offer participants insight.

Prerequisites

'Introduction to Gas Chromatographs' course or equivalent knowledge.

Topics

- Understanding Chromatograph Flow Configurations
- Overhauling Valves
- Reviewing Thermal Conductivity, Flame Ionization, and Flame Photometric Detectors
- Understanding Sample/Carrier/Calibration Gas Systems
- Working With the 2350A Controller
- Installing and Using MON Software for Integration and Calibration
- Setting Timed Events, Retention Times, and Response Factor Calculations
- Understanding Startup Procedures
- Setting Valve Timing and Flows with Different Flow Configurations
- Checking for Proper Separation and Analyzing Gas Chromatographs
- Verifying Proper Operation of the Gas Chromatograph
- Troubleshooting the Chromatograph and 2350A Controller
- Configuring Reporting Details and Control Outputs
- Conducting Preventative Maintenance
- Communicating to Other Devices
- Reviewing Spare Parts Recommendations

Available On Request in Houston, TX or On-Site

Classes typically start at 1 pm on Monday and end at 12 pm on Friday to accommodate travel.

Advanced Process GC 700XA**Course R4315****Overview**

This 5-day course equips students with a full understanding of many advanced techniques used in process gas chromatography. An experienced instructor and focused material enable students to troubleshoot a variety of field issues.

Prerequisites

Operation and Maintenance of Gas Chromatographs

Topics

- Setting Valve Timing
- Hardware Troubleshooting
- Mixture Adjustments for FID
- Mixture Adjustment for FPD
- Proper Setting Timed
- Overview of Model 1500XA
- Liquid Sample Injection
- Review of Sample System Techniques
- Calibration and Accuracy Checks
- Recovery of GC After Analysis Interruption
- GC Start-up After Overhaul

Available On Request in Houston, TX or On-Site

Classes typically start at 1 pm on Monday and end at 12 pm on Friday to accommodate travel.

Advanced 1500XA Gas Chromatographs**Course R4316****Overview**

This 5-day course equips students with a full understanding of many advanced techniques used in process gas chromatography. An experienced instructor and focused material enable students to troubleshoot a variety of field issues.

Prerequisites

'Operation and Maintenance of Gas Chromatographs' course.

Topics

- Setting Valve Timing
- Troubleshooting Hardware
- Understanding Mixture Adjustments for FID/FPD
- Setting Timed Events
- Reviewing Liquid Sample Injection
- Reviewing Sample System Techniques
- Performing Calibration and Accuracy Checks
- Recovering GC After Analysis Interruption
- Starting Up and Overhauling the GC

Available On Request in Houston, TX or On-Site

Classes typically start at 1 pm on Monday and end at 12 pm on Friday to accommodate travel.

To enroll in Rosemount Analytical courses please call 713-396-8771

For additional contact information refer to the appropriate contact on page 109. Updated dates & locations are available on our website at www.emersonprocess.com/education.

Liquid Instruments

With a wide selection of sensors, analyzers, gas chromatographs, and other measurement and analysis technologies, Rosemount Analytical helps customers streamline process performance with innovative improvements that increase throughput, minimize energy usage, maximize asset life, and take advantage of continuous online diagnostics for amazing results.

ROSEMOUNT
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General pH, Conductivity, and ORP Theory

Course 2200 CEUs: .7

Overview

This 1-day course provides a solid theoretical background in pH, conductivity, and ORP measurements. Students will:

- understand how each measurement is made
- recognize installation/application problems
- learn configuration/calibrate procedures
- how to implement a maintenance program
- troubleshooting problems using diagnostics

Topics

- What is pH/Conductivity/ORP
- How pH/Conductivity/ORP Measurements are Made
- Physical Process Properties and How They Effect On-Line Measurements
- Proper Calibration Techniques
- Cleaning and Maintenance of a Sensor
- Choosing Correct Sensor for any Process
- How to Decipher Diagnostics Readouts
- pH/Conductivity Sensor Overview
- pH/Conductivity/ORP Analyzer Overview

Available on Request or at Customer Site

Amperometric Measurement Theory: Chlorine, Dissolved Oxygen & Ozone

Course 2201 CEUs: .7

Overview

This 1-day course provides insight into the complicated amperometric measurements of chlorine, dissolved oxygen and ozone. Students will learn the concepts of how amperometric sensors work and how to calibrate each type of measurement. Students will:

- differentiate the various species of chlorine
- implement a proper maintenance program
- use diagnostics to troubleshoot problems

Topics

- Amperometric Measurement Theory
- Chlorine/Dissolved Oxygen/Ozone
- Calibration Procedures for Each Measurement
- Maintenance & Troubleshooting Tips

Available on Request or at Customer Site

Rosemount Analytical Two-Wire Instrumentation Models Xmt and 5081 Transmitters

Course 2202/2202V CEUs: .2

Overview

This 2-hour class covers features, benefits and operation of any Rosemount Analytical Model 5081 or Model Xmt two wire transmitters. Each transmitter family can measure pH, ORP, contacting conductivity, toroidal conductivity, chlorine, dissolved oxygen and ozone. Both transmitters have advanced diagnostic capabilities and can communicate via HART or Foundation Fieldbus communication protocols.

Topics

- Installation and Application Problems
- Configuration of Outputs (HART Only)
- Use Diagnostic Features (If Applicable)
- Sensor Calibration
- Troubleshooting

Available on Request or at Customer Site

Types of Liquid Instruments Training:

Formal Classes are performed on-site or at the Irvine, CA facility in a classroom setting and last from 4 to 8 hours depending on the measurements covered and instrumentation selected. This class is designed to expand a student's sensor measurement knowledge, explain how to properly configure the analyzer to meet plant's monitoring and control needs, proper calibration and care for the sensor, and use of diagnostic variables to troubleshoot problems and schedule routine maintenance or sensor replacement.

Remote Training is performed at an off-site facility and is offered to our customer base as demand dictates. Structured as a formal class, remote training offers both lecture and hands-on instruction at a location that more effectively meets our customers' requirements.

Rosemount Analytical Wireless Instrumentation Models 6081P and 6081C

Course 2203/2203V CEUs: .2

Overview

This 2-hour class covers features, benefits, and operation of the Rosemount Analytical Model 6081 wireless device. The Model 6081P measures pH and ORP and is SMART sensor enabled. The Model 6081C measures contacting conductivity with sensors that have either 2-wire or 4-wire inputs. Each device communicates back to a 1420 Gateway via Wireless HART communication.

Topics

- Connecting the Model 6081 to a Wireless Mesh Network
- Configuring Update Rates
- Mesh Network Theory
- Sensor Calibration
- Troubleshooting

Available on Request or at Customer Site

Rosemount Analytical Four-Wire Instrumentation Models 54e, 1055, 1056, or 1057

Course 2204/2204V CEUs: .2

Overview

This 2-hour class covers features, benefits, and operation of any Rosemount Analytical Model 54e, 1055, 1056, or 1057. Each analyzer family can measure pH, ORP, contacting conductivity, toroidal conductivity, chlorine, dissolved oxygen, and ozone. The Model 1056 can also measure turbidity in drinking water and flow from a pulse sensor, and display any 4-20mA signal input. Each instrument has its own available features, and menu tree which will be covered in great detail.

Topics

- Installation and Application Problems
- Configuration of Outputs / Alarms (If Applicable)
- Programming of Automated Cleaning Systems (DO, pH)
- Use Diagnostic Features (If Applicable)
- Sensor Calibration
- Troubleshooting

Available on Request or at Customer Site

Customer Specific Measurement Theory

Course 2205/2205V CEUs: .7

Overview

This 7-hour class is fully customized to cover the specific measurements that the customer requests. A certified trainer will cover up to 4 subjects in one day. The 4 subjects may be measurement or product related. The list of measurements that can be bundled into a tailored made training course are pH, ORP, contacting conductivity, toroidal conductivity, turbidity, chlorine, dissolved oxygen, and ozone. Each measurement theory has its own duration which can be modified to fit the customers' time frame needs. Select an analyzer (course 2204) or transmitter (course 2202) to accompany the measurement theories for a well-rounded class.

Topics

- Installation and Application Problems
- Configuration of Outputs / Alarms (If applicable)
- Use Diagnostic Features (If Applicable)
- Sensor Calibration & Maintenance
- Troubleshooting

Available on Request or at Customer Site



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LEARNING PATH

Typical Technician's Training Path

Process Measurement
Products I (Pressure &
Temperature) 2326

Process Measurement
Products II (DP Flow)
2327

Process Measurement
Products III (Level)
2333

AMS Device Manager
7020

AMS Device Manager with
Rosemount HART 7021

Fieldbus Measurement
Instruments
2370

Typical Engineer's Training Path

Process Measurement
Products I (Pressure &
Temperature) 2326

Process Measurement
Products II (DP Flow)
2327

Process Measurement
Products III (Level)
2333

Introduction to
Process Control
9000

AMS Device Manager
7020

AMS Device Manager with
Rosemount® HART® 7021

Fieldbus Measurement
Instruments 2370

To enroll in Rosemount
courses or for more
information, please call:
800-338-8158 or 641-754-3771

Process Measurement Products I (Pressure and Temperature)

Course 2326 CEUs: 2.8

This course is intended for technicians, engineers and other plant personnel who need to know installation, calibration, maintenance and troubleshooting of measurement instrumentation.

Overview

This 4-day course explains how pressure and temperature transmitters function and how they are installed and calibrated. It emphasizes installation, proper set-up and calibration of Analog and Smart Pressure and Temperature Transmitters. The course uses lectures and labs to teach the students. Those who complete this class will be able to:

- correctly perform installation and setup procedures
- properly configure Smart Transmitters
- properly calibrate transmitters
- perform basic troubleshooting

Prerequisites

Some experience in instrument calibration, maintenance, installation and operation would be helpful.

Topics

- Basic 4-20 mA Loop Setup
- Pressure Sensors
- Temperature Sensors (TC, RTD)
- Analog Transmitters (1151)
- HART Communication
- Field Communicator
- Smart Transmitters (1151S, 2088, 3051C & S, 644, 3144P, Tri-Loops)
- Using AMS Device Manager to Configure and Calibrate Smart Transmitters
- Test Equipment Selection
- Installation
- Configuration
- Calibration
- Troubleshooting

Process Measurement Products II (DP Flow)

Course 2327 CEUs: 1.4

This course is intended for technicians, engineers and other plant personnel who need to know installation, calibration, maintenance and troubleshooting of DP flow measurement instrumentation.

Overview

This 2-day course explains how DP flow instruments function and how they are installed and calibrated. It emphasizes installation, proper setup and calibration of DP flow instruments. The course uses lectures and labs to teach the students. Those who complete this class will be able to:

- correctly install configure, calibrate multivariable DP Flow Transmitters
- perform DP Flow troubleshooting

Prerequisites

Some experience in instrument calibration/verification, maintenance, installation and operation would be helpful.

Topics

- Basic DP Flow Fundamentals
- DP Flow Sizing Calculations
- Multivariable Flow Transmitters
- AMS Device Manager with Engineering Assistant Snap-ON (3095)
- Engineering Assistant for 3051SMV
- Field Communicator
- Test Equipment Selection
- Installation
- Configuration
- Calibration / Verification
- Troubleshooting DP Flow Installation

Rosemount Rosemount's leadership in the design, manufacture, and application of smart field instrumentation is unchallenged for pressure, level, temperature, and flow measurement instruments to monitor and control processes. The vast amounts of information generated by these devices make possible lower automation costs, improved plant performance, faster troubleshooting, fewer unscheduled shutdowns, and lower maintenance costs. For this reason, Rosemount sponsors more than two-dozen courses covering product installation, configuration, calibration & maintenance.

Process Measurement Products III (Level)

Course 2333 CEUs: 2.1

This course is intended for technicians, engineers and other plant personnel who need to know installation, calibration, maintenance and troubleshooting of level measurement instrumentation.

Overview

This 3-day course explains how level instruments function and how they are installed calibrated/verified. It emphasizes installation, proper setup and calibration/verification of level instruments. The course uses lectures and labs to teach the students. Those who complete this class will be able to:

- correctly install DP Level Transmitters
- correctly install Guided Wave Radar Transmitters
- correctly install Non-contacting Radar Transmitters
- properly calibrate Level Instruments
- perform basic troubleshooting

Prerequisites

Experience in instrument calibration, maintenance, installation and operation would be helpful.

Topics

- DP Level Fundamentals
- Electronic Remote Sensors
- Radar Applications
- Radar Instruments
- Radar PC Software
- Field Communicator
- Installation
- Configuration
- Calibration / Verification
- Troubleshooting

Fieldbus Measurement Instruments

Course 2370 CEUs: 2.8

This course is for individuals responsible for installing, configuring, calibrating, and troubleshooting FOUNDATION™ fieldbus measurement devices.

Overview

This 4-day class covers the integration of FOUNDATION™ fieldbus compliant measurement devices using the Field Communicator, AMS Device Manager and other hosts. Upon completion of this course students will be able to: install, configure, calibrate, and troubleshoot Rosemount Fieldbus devices which include the 3051C and 3051S Pressure transmitters, 644, 3144P and 848 Temperature transmitters, 8742/8732 Magnetic Flow transmitter, 8800 Vortex Flow transmitter, 5600, 5400 and 5300 Radar Level Transmitters, and 752 Indicator.

Prerequisites

Experience in instrument calibration, maintenance, installation and operation would be helpful.

Topics

- FOUNDATION™ fieldbus Overview
- Fieldbus: Wiring/Segment Design/Function Blocks
- Field Communicator Operation
- AMS Device Manager Operation
- Theory of Operation, Installation, Configuration, Maintenance, Calibration and Troubleshooting on the following:
 - 3051C Pressure Transmitter
 - 3051S Pressure Transmitter
 - 3144P, and 644 Temperature Transmitters
 - 848 Temperature Transmitter
 - 8742/8732 Mag Flow Transmitter
 - 8800 Vortex Transmitter
 - 5600/5400/5300 Radar Level Transmitter
 - 752 Fieldbus Indicator

Note: Course may be conducted using other Fieldbus Hosts, such as AMS Device Manager.

3051 Smart Pressure Transmitter

Course 2305 CEUs: .7

This course is designed for those individuals responsible for the installation, configuration, calibration and maintenance of the Rosemount Model 3051 Smart Pressure Transmitter.

Overview

This 1-day course uses lectures and labs to teach the student how to install, configure, calibrate and maintain the Rosemount Model 3051 Smart Pressure Transmitter.

The student will also learn the operation of the Field Communicator. Students will:

- explain the differences between Smart & Analog transmitters
- identify 3051 parts and functionality
- explain the principles of operation of the 3051
- configure, calibrate and test 3051 Smart Pressure Transmitters using the Field Communicator or AMS Device Manager
- properly install/ troubleshoot the 3051 Smart transmitter

Prerequisites

Knowledge of basic pressure fundamentals and pressure instrumentation.

Topics

- Smart and Analog Transmitters
- 3051 Overview and Principles of Operation
- Test Equipment Selection
- Bench Testing the 3051 Smart Transmitter
- Field Communicator Operation
- AMS Device Manager Operation
- Digital Trims/Calibration
- Installation and Start-up
- Troubleshooting and Maintenance

Note: This product is also included courses 2326 and 2329.

To enroll in Rosemount courses please call 800-338-8158 or 641-754-3771. For additional contact information refer to the appropriate contact on page 109. Updated dates & locations are available on our website at www.emersonprocess.com/education.

3051C Fieldbus Pressure Transmitter

Course 2307 CEUs: .7

This course is designed for those individuals responsible for the installation, configuration, calibration and maintenance of the Rosemount Model 3051 Fieldbus Pressure Transmitter.

Overview

This 1-day course uses lectures and labs to maximize the hands on experiences and teach the student how to install, configure, calibrate and maintain the Rosemount Model 3051 Fieldbus Pressure Transmitter.

The student will also learn the operation of the Field Communicator. Students who complete this course will be able to:

- identify 3051 parts and functionality
- explain the principles of operation of the 3051
- design and build a Fieldbus segment
- configure, test, and calibrate the 3051 Fieldbus Pressure Transmitters using the Field Communicator
- properly install and troubleshoot the 3051 Fieldbus Transmitter

Prerequisites

Knowledge of basic pressure fundamentals and pressure instrumentation.

Topics

- 3051 Overview and Principles of Operation
- FOUNDATION™ fieldbus Overview
- Fieldbus Wiring/Segment Design/Function Blocks
- Test Equipment Selection
- Bench Testing 3051 Fieldbus Transmitter
- Field Communicator Operation
- AMS Device Manager Operation
- Digital Trims/Calibration
- Installation and Start-Up
- Troubleshooting and Maintenance

Note: Course may be conducted AMS Device Manager. Product is also part of course 2370.

3051S Smart Pressure Transmitter

Course 2308 CEUs: .7

This course is designed for those individuals responsible for the installation, configuration, calibration, troubleshooting, and maintenance of the Rosemount Model 3051S Smart Pressure Transmitter.

Overview

This 1-day course uses lectures and labs to maximize the hands on experiences and teach the student how to install, configure, calibrate, troubleshoot, and maintain the Rosemount Model 3051S Smart Pressure Transmitter. The student will also learn the operation of the Field Communicator or AMS Device Manager. Students who complete this course will be able to:

- identify 3051S parts and functionality explain the principles of operation of the 3051S
- configure and test the 3051S Smart Pressure Transmitters using the Field Communicator or AMS Device Manager
- properly install, configure, calibrate, and troubleshoot the 3051S Smart transmitter

Prerequisites

Knowledge of basic pressure fundamentals and pressure instrumentation.

Topics

- 3051S Overview/Principles of Operation
- 3051S Installation and Options
- Test Equipment Selection
- Configure & Bench Testing the 3051S Smart Transmitter
- Configure and Test the 3051S Advanced Features:
 - Alarm & Saturation Levels, Alarm Direction, Write Protection,
 - Process Alerts, Scaled Variable
- Digital Trims/Calibration
- Troubleshooting and Maintenance

3051MV Multi-Variable Mass Flow Transmitter

Course 2308MV NEW CEUs: .7

This course is designed for those individuals responsible for the installation, configuration, calibration and maintenance of the Rosemount 3051SMV Transmitter.

Overview

This 1-day course uses lecture and labs to maximize the hands on experience and teach the student how to install, configure, calibrate and maintain the Rosemount Model 3051SMV Smart Mass Flow Transmitter. Students who complete this course will:

- identify transmitter parts and explain their functionality
- explain the principles of operation of the transmitter
- configure and test using the Field Communicator, AMS Device Manager, and the 3051SMV Engineering Assistant software
- configure the compensated flow parameters using the 3051SMV Engineering Assistant Software
- properly install & troubleshoot the 3051SMV transmitter

Prerequisites

Knowledge of basic Pressure, and DP Flow fundamentals and instrumentation.

Topics

- DP Flow Fundamentals
- Overview and Principles of Operation
- Test Equipment Selection
- Temperature Sensor Wiring
- Bench Testing the Smart Transmitters
- 3051SMV Engineering Assistant Software
- Operation of the Field Communicator and AMS Device Manager
- Digital Trims/Calibration
- Installation and Start-Up
- Troubleshooting and Maintenance

Note: Product is also included in course 2327 and 2329.

3051S Electronic Remote Sensors Systems

Course 2308ER NEW CEUs: .7

This course is designed for those individuals responsible for the installation, configuration, calibration, troubleshooting and maintenance of the Rosemount 3051S Electronic Remote Sensors (ERS) System.

Overview

This 1-day course uses lecture and labs to maximize the hands on experience and teach the student how to install, configure, calibrate, maintain, and troubleshoot the Rosemount 3051S ERS System. Students who complete this course will:

- Identify transmitter parts and explain their functionality
- Identify 3051S ERS Hi & Lo Sensors
- Explain the principles of operation of the ERS System
- Configure and test the ERS system using AMS Device Manager and the Field Communicator
- Perform Zero Trims and Calibrate the ERS Sensors
- Properly install & troubleshoot the 3051S ERS System

Prerequisites

Knowledge of basic Pressure, and DP Level fundamentals & instrumentation.

Topics

- DP Level Technology
- ERS Technology
- ERS Overview and Principles of Operation
- ERS / DP Level Installation
- ERS Wiring
- ERS Configuration with AMS Device Manager and the Field Communicator
- ERS Module Assignments
- ERS Scaled Variable
- Bench Testing the ERS System
- ERS Zero Trims and Calibration
- Troubleshooting and Maintenance

3144P Temperature Transmitters

Course 2321 CEUs: .7

This course is designed for those individuals responsible for the installation, configuration, calibration and maintenance of the Rosemount Model 3144P Smart Temperature Transmitters.

Overview

This 1-day course uses lecture and labs to teach the student how to install, configure, calibrate and maintain the Rosemount Model 3144P Smart Temperature Transmitters. The student will also learn the operation of the Field Communicator. Students who complete this course will:

- identify 3144P parts and explain their functionality
- explain the principles of operation of the 3144P
- configure, calibrate and test 3144P Smart Temperature Transmitters using the Field Communicator or AMS Device Manager
- properly install and troubleshoot the 3144P Smart Transmitters

Prerequisites

Knowledge of basic temperature fundamentals and temperature instrumentation.

Topics

- 3144P Overview and Principles of Operation
- Test Equipment Selection
- Sensor Selection and Wiring
- Bench Testing the 3144P Smart Transmitters
- Field Communicator Operation
- AMS Device Manager Operation
- Digital Trims/Calibration
- 3144P Dual Sensor Setup and Configuration
- Installation and Start-Up
- Troubleshooting and Maintenance

Note: This product is also included courses 2326 and 2329.

3144P Fieldbus Temperature Transmitters

Course 2324 CEUs: .7

This course is designed for those individuals responsible for the installation and maintenance of the Rosemount Model 3144P Fieldbus Temperature Transmitters.

Overview

This 1-day course uses lecture and labs to maximize the hands on experiences and teach the student how to install, configure, calibrate, troubleshoot, and maintain the Rosemount Model 3144P Fieldbus Temperature Transmitters.

The student will also learn the operation of the Field Communicator. Students who complete this course will be able to:

- identify 3144P parts and explain their functionality
- explain principles of operation of the 3144P
- design and build a Fieldbus segment
- configure, calibrate, and test 3144P Fieldbus Temperature transmitters using the Field Communicator
- properly install and troubleshoot the 3144P Fieldbus Transmitters

Prerequisites

Knowledge of basic temperature fundamentals and temperature instrumentation.

Topics

- 3144P Overview and Principles of Operation
- FOUNDATION™ fieldbus Overview
- Fieldbus Wiring
- Fieldbus Segment Design
- Fieldbus Function Blocks
- Test Equipment Selection
- Sensor Selection and Wiring
- Bench Testing 3144P Fieldbus Transmitters
- Field Communicator Operation
- Digital Trims/Calibration
- Installation and Start-Up
- Troubleshooting and Maintenance

Note: Course may be conducted using AMS Device Manager.

To enroll in Rosemount courses please call 800-338-8158 or 641-754-3771. For additional contact information refer to the appropriate contact on page 109. Updated dates & locations are available on our website at www.emersonprocess.com/education.

848 Fieldbus Temperature Transmitters

Course 2328 CEUs: .7

This 1-day course uses lectures and labs to maximize the hands on experiences and teach the student how to install, configure, troubleshoot, and maintain the Rosemount Model 848T Fieldbus Temperature Transmitters.

Overview

The student will also learn the operation of the Field Communicator. Students who complete this course will be able to:

- explain the principles of operation of the 848T
- configure, calibrate, and test the 848T Fieldbus temperature transmitter using the Field Communicator
- design and build a Fieldbus segment
- properly install and troubleshoot the 848T Fieldbus Transmitter

Prerequisites

Knowledge of basic temperature fundamentals and temperature instrumentation.

Topics

- 848T Overview and Principles of Operation
- FOUNDATION™ fieldbus Overview
- Fieldbus Wiring
- Fieldbus Segment Design
- Fieldbus Function Blocks (including the MAI, and ISEL Blocks)
- Test Equipment Selection
- Sensor Selection and Wiring
- Bench Testing the 848T Fieldbus Transmitters
- Field Communicator Operation
- Digital Trims/Calibration
- Installation and Start-Up
- Troubleshooting and Maintenance

Note: Course may be conducted using other Fieldbus Hosts, call with any questions.

3095FT Flow Transmitter

Course 2342 CEUs: .7

This course is designed for those individuals responsible for the installation and maintenance of the Rosemount 3095 FT Flow Transmitter.

Overview

This 1-day course uses lectures and labs to teach the student how to install and maintain the Rosemount Model 3095FT Flow Transmitter. The student will also learn the operation and interface capabilities of the Rosemount Model 3095FT User Interface Software. Students who complete this will:

- explain EFM devices
- identify 3095FT parts/explain functionality
- explain the principles of operation of the multivariable sensor module
- properly install the Model 3095FT Smart Flow Transmitter
- configure and calibrate the Model 3095FT with the 3095FT User Interface Software
- identify transmitter flow calculation methods and identify audit trail data logs
- troubleshoot and maintain the Rosemount 3095FT Flow Transmitter

Prerequisites

Basic computer skills and knowledge of flow fundamentals.

Topics

- Electronic Flow Measurement Applications
- 3095FT Flow Transmitter Overview
- Multivariable Sensor Module and Electronics Module
- Flow Calculation and Data Logging
- Test Equipment Selection
- Configuring and Calibrating with the 3095FT User Interface Software
- Remote Power Supply
- Installation of 3095FT Flow Transmitters
- Troubleshooting and Maintenance

3095MV Multi-Variable Transmitters

Course 2343 CEUs: .7

This course is designed for those individuals responsible for the installation and maintenance of the Rosemount 3095 MV Transmitter.

Overview This 1-day course uses lecture and labs to teach the student how to install, configure, calibrate and maintain the Rosemount Model 3095MV Smart Transmitters. The student will also learn the operation of the Field Communicator. Students who complete this course will:

- identify transmitter parts and explain their functionality
- explain the principles of operation of the transmitter
- configure and test using the Field Communicator and the 3095MV Engineering Assistant Snap-On software
- configure the compensated flow parameters using AMS Device Manager with the 3095MV Engineering Assistant Snap-On Software
- properly install/troubleshoot transmitters

Prerequisites

Knowledge of basic pressure and temperature fundamentals/instrumentation.

Topics

- DP Flow Fundamentals
- Overview and Principles of Operation
- Test Equipment Selection
- Temperature Sensor Wiring
- Bench Testing the Smart Transmitters
- AMS Device Manager with the 3095MV EA Snap-On Software
- Operation of the Field Communicator and AMS Device Manager
- Digital Trims/Calibration
- Installation and Start-Up
- Troubleshooting and Maintenance
- Configure/Wire/Setup the HART Tri-Loop

Note: This course is also included in the 2-day DP Flow course 2327.

Model 3095FB Modbus Multi-Variable Transmitter

Course 2345 CEUs: .7

This course is designed for those individuals responsible for the installation, configuration, calibration, and maintenance of the Rosemount Model 3095 Modbus Transmitters.

Overview

This 1-day course uses lecture and labs to teach the student how to install, configure, calibrate, and maintain the Rosemount Model 3095 Modbus Transmitters.

The student will also learn the operation of the Rosemount Configurator User Interface Software. Students who complete this course will be able to:

- explain the principles of operation of the transmitter
- configure and test using the Rosemount Configurator User Interface software
- properly install, calibrate and troubleshoot the transmitters
- properly configure the transmitters Modbus parameters

Prerequisites

Knowledge of basic pressure, temperature, and flow instrumentation. Basic Modbus knowledge helpful.

Topics

- Overview and Principles of Operation
- Flow Fundamentals
- Bench Testing the Modbus Transmitter
- Rosemount Configurator User Interface Operation
- Sensor Trims
- Installation and Start-Up
- Troubleshooting and Maintenance
- Modbus Communication, Configuration, and Integration

3300 Guided Wave Radar Level Transmitter

Course 2332 CEUs: .7

This course is for those individuals responsible for the installation, configuration, verification and maintenance of the Rosemount Model 3300 Series Guided Wave Radar (GWR) Level Interface Transmitters.

Overview

This 1-day course uses lecture and labs to maximize the hands on experience and teach the student how to install, configure, calibrate, troubleshoot and maintain the Rosemount Model 3300 GWR Level & Interface Transmitters. Students who complete this course will be able to:

- explain the principles of operation of the 3300 GWR
- identify 3300 parts and explain their functionality
- understand the available probe options and when each should be used
- properly install the 3300 GWR
- configure and test the 3300 GWR
- properly troubleshoot the 3300 GWR transmitter using RCT software

Prerequisites

Knowledge of basic level and interface fundamentals and instrumentation.

Topics

- 3300 Overview/Principles of Operation
- Installation of the 3300 GWR
- Configuration of the 3300 GWR
- Bench Testing the 3300 GWR
- Field Communicator Operation
- AMS Device Manager Operation
- Radar Configuration Tools (RCT) Software Operation
- Calibration, Verification and Adjustments
- Troubleshooting and Maintenance
- Troubleshooting and Reading Tank Graphs Using RCT Software

Note: 3300 GWR is also included in the 3-day Level course #2333

5300 High Performance Guided Wave Radar HART Level Transmitter

Course 2337H CEUs: .7

This course is designed for those individuals responsible for the installation, configuration, calibration and maintenance of the Rosemount Model 5300 High Performance Guided Wave Radar (GWR) Series HART Radar Level Transmitter.

Overview

This 1-day course uses lecture and labs to maximize the hands on experience and teach the student how to install, configure, troubleshoot and maintain the Rosemount Model 5300 High Performance GWR Transmitters. Students who complete this course will be able to:

- explain the principles of operation of the 5300 GWR
- identify 5300 GWR parts and explain their functionality
- understand the available probe options and when each should be used
- Properly install and wire the 5300 GWR
- configure and test the 5300 GWR
- understand how to setup the 5300 GWR to work in different applications
- properly troubleshoot the 5300 GWR Transmitter and Installation using Radar Master software

Prerequisites Knowledge of basic level fundamentals and instrumentation.

Topics

- 5300 Overview and Principles of Operation
- Installation of the 5300 GWR
- Wiring the 5300 GWR
- Configuration of the 5300 GWR
- Bench Testing the 5300 GWR
- Field Communicator Operation
- AMS Device Manager Operation
- Radar Master Software Operation
- Troubleshooting and Maintenance
- Tank & Application Troubleshooting and Echo Handling Using Radar Master Software

Note: 5300 GWR Hart Level transmitter is also included in the 3-day Level course 2333.

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5600 Series Fieldbus Radar Level Transmitter**Course 2334F CEUs: .7**

This course is designed for those individuals responsible for the installation, configuration, calibration and maintenance of the Rosemount Model 5600 Series Fieldbus Radar Level Transmitter.

Overview

This 1-day course uses lecture and labs to maximize the hands on experience and teach the student how to install, configure, troubleshoot and maintain the Rosemount Model 5600 Series Fieldbus Radar Level Transmitters. Students who complete this course will be able to:

- explain the principles of operation of the 5600 Radar
- identify 5600 Radar parts and explain their functionality
- design and build a Fieldbus segment
- properly install and wire the 5600 Radar
- configure and test the 5600 Radar
- understand how to setup the 5600 Radar to work in different applications
- properly troubleshoot the 5600 Radar Transmitter using Radar Master software

Prerequisites

Knowledge of basic level fundamentals and instrumentation.

Topics

- 5600 Overview and Principles of Operation
- Installation of the 5600 Radar
- Fieldbus Overview
- Fieldbus Wiring & Segment Design
- Fieldbus Function Blocks
- Wire, Configure, and Test the 5600 Radar
- 2210 LOI / Display Operation
- Field Communicator Operation
- Radar Master Software Operation
- Troubleshooting and Maintenance
- Tank & Application Troubleshooting and Echo Handling using Radar Master Software

Note: This product is also included in the 4-day Fieldbus course 2370.

5600 Series HART Radar Level Transmitter**Course 2334H CEUs: .7**

This course is designed for those individuals responsible for the installation, configuration, calibration and maintenance of the Rosemount Model 5600 Series HART Radar Level Transmitter.

Overview

This 1-day course uses lecture and labs to maximize the hands on experience and teach the student how to install, configure, troubleshoot and maintain the Rosemount Model 5600 Series HART Radar Level Transmitters. Students who complete this course will be able to:

- explain the principles of operation of the 5600 Radar
- identify 5600 Radar parts and explain their functionality
- properly install and wire the 5600 Radar
- configure and test the 5600 Radar
- understand how to setup the 5600 Radar to work in different applications
- properly troubleshoot the 5600 Radar Transmitter using Radar Master software

Prerequisites

Knowledge of basic level fundamentals and instrumentation.

Topics

- 5600 Overview and Principles of Operation
- Installation of the 5600 Radar
- Wiring the 5600 Radar
- Configuration of the 5600 Radar
- Bench Testing the 5600 Radar
- 2210 LOI / Display Operation
- Field Communicator Operation
- AMS Device Manager Operation
- Radar Master Software Operation
- Troubleshooting and Maintenance
- Tank & Application Troubleshooting and Echo Handling using Radar Master Software

Note: This product is also included in the 3-day level course 2333.

5400 Series HART Radar Level Transmitter**Course 2336H CEUs: .7**

This course is designed for those individuals responsible for the installation, configuration, calibration and maintenance of the Rosemount Model 5400 HART Radar Level Transmitter.

Overview

This 1-day course uses lecture and labs to maximize the hands on experience and teach the student how to install, configure, troubleshoot and maintain the Rosemount Model 5400 Radar Transmitters. Students who complete this course will be able to:

- explain the principles of operation of the 5400 Radar
- identify 5400 Radar parts and explain their functionality
- properly install and wire the 5400 Radar
- configure and test the 5400 Radar
- understand how to setup the 5400 Radar to work in different applications
- properly troubleshoot the 5400 Radar Transmitter and the Installation using Radar Master software

Prerequisites

Knowledge of basic level fundamentals and instrumentation.

Topics

- 5400 Overview and Principles of Operation
- Installation of the 5400 Radar
- Wiring the 5400 Radar
- Configuration of the 5400 Radar
- Bench Testing the 5400 Radar
- Field Communicator Operation
- AMS Device Manager Operation
- Radar Master Software Operation
- Troubleshooting and Maintenance
- Tank & Application Troubleshooting and Echo Handling using Radar Master Software

Note: This product is also included in the 3-day level course 2333

Wireless Self Organizing Network

Course 2375 CEUs: 1.4

This course is intended for technicians, engineers and other plant personnel who need to know how to design, install, setup, configure, maintain and troubleshoot Wireless Self Organizing Networks and their components.

Overview

This 2-day course explains how Self Organizing Wireless Networks function and how they are installed, setup, configured and integrated. It emphasizes planning, proper installation and startup, configuration, maintenance, and integration. The course uses lectures and labs to maximize the hands on experience and teach the students. Students who complete this course will:

- correctly install and setup the 1420 Wireless Gateway
- properly install and configure Wireless Transmitters
- properly integrate Host interfaces to the Wireless Gateway

Prerequisites

Some experience in Networks and Host integration would be helpful.

Topics

- How Self Organizing Networks Function
- Self Organizing Networks Best Practices
- Network Components
- 1420 Installation and Setup
- Network Parameters
- Wireless Transmitters Installation, Configuration, Maintenance and Calibration
- THUM Installation, Wiring and Configuration
- Integrating and operating AMS Device Manager with the 1420 Wireless Gateway
- Operation of AMS Wireless Snap-On
- Modbus Serial Integration
- Modbus TCP Integration
- OPC Integration

AMS Device Manager

Course 7020 CEUs: 2.1

Overview Completing 3-days of AMS Device Manager hands-on instructor assisted training modules and exercises, provides the quickest route to your productive use of this predictive maintenance application. The training exercises focus on skills required by engineers and technicians, and are based on real-world tasks that most users will encounter on the job.

7020-1 Configuring and Using AMS Device Manager

- Viewing and Modifying Devices
- Creating a Plant Database Hierarchy and Adding Devices
- Field Communicator - AMS Device Manager
- AMS Device Manager Browser Functions
- Audit Trail
- Calibrating Device - Calibration Assistant
- Configuring and Monitoring System Alerts

7020-2 System Administration

- AMS Device Manager System Overview
- Installing an AMS Device Manager Server Plus Standalone
- Starting AMS Device Manager for the First Time
- Network Communication Interface Setup
- AMS Device Manager Database Management
- Installing a Distributed System
- Installing Device Types from Media

7020-3 SNAP-ON™ Applications

- AMS ValveLink® SNAP-ON Application-Basics
- MV Engineering Assistant SNAP-ON Application - Basics
- AMS Wireless SNAP-ON Application
- QuickCheck™ SNAP-ON Application
- Using AMS Device Manager OPC Server and the Matrikon OPC Explorer
- AMS Device Manager Web Services
- AlertTrack SNAP-ON Application

This instructor assisted course is operated in a hands-on, self-paced environment, which allows the student to work at their individual pace. Training can also be delivered at your plant with the help of our certified instructors. AMS Device Manager modules may be purchased for self-study for \$195 each or \$495 for all three paper/bound modules.

To Order

Please contact your local sales representative or visit site below to locate your regional office:
<http://www2.emersonprocess.com/en-US/brands/fisher/Contacts/Pages/Contacts.aspx>

AMS Device Manager with Rosemount HART Instruments

Course 7021 CEUs: 2.1

Learn the installation, calibration, maintenance, and troubleshooting of measurement instrumentation using AMS Device Manager. The hand's on focus is on skills required by engineers, technicians, or others that are new to the plant or instrument environment.

Overview

This 3-day course teaches maintenance and calibration of measurement devices using AMS Device Manager software to communicate and track information. The student will learn how pressure and temperature transmitters function, are installed, and calibrated using AMS Device Manager. The course uses hands-on training, labs, and lecture to teach the student how to:

- configure and use AMS Device Manager
- correctly perform transmitter installation and setup procedures
- properly configure SMART transmitters
- properly calibrate transmitters
- perform basic troubleshooting-transmitters

Topics

- Configuring and Using AMS Device Manager
- HART Communication
- SMART Transmitters (3051C, 3144P)
- Test Equipment Selection
- Transmitter Installation
- Transmitter Configuration
- Transmitter Calibration
- AMS Device Manager Calibration Assistant SNAP-ON
- Intelligent Calibrators
- Transmitter Troubleshooting

To enroll in Rosemount courses please call 800-338-8158 or 641-754-3771. For additional contact information refer to the appropriate contact on page 109. Updated dates & locations are available on our website at www.emersonprocess.com/education.

8700 Series Smart Magnetic Flowmeter

Course 2340 CEUs: .7

This course is intended for anyone that is involved with properly installing, wiring, configuring and troubleshooting a Rosemount 8700 Series Smart Magnetic flowmeter. Typical job functions include; maintenance technicians, instrument technicians and instrumentation engineers.

Overview

This 1-day course consists of a blend of lectures and hands-on exercises that cover how to install, configure, and maintain the Rosemount 8700 Series Magnetic Flowmeter Systems composed of the Model 8712 and 8732 Transmitters and the 8705 Flanged and 8711 Wafer Sensors. The students will learn the operation and capabilities of the Local Operator Interface & Field Communicator and how to use these tools to perform configuration. Common issues encountered and troubleshooting techniques will also be covered.

Prerequisites

Knowledge of basic flow fundamentals and instrumentation.

Topics

- Magnetic Flowmeter System
- Smart vs. Analog Transmitters
- Flow Tube Selection
- Configuring Using LOI, Field Communicator or AMS Device Manager
- Local Operator Interface Functions
- Positive Zero Return
- Auxiliary Functions and Special Units
- Signal Conditioning
- System Troubleshooting and Maintenance
- Bench Testing/Digital Trims
- Process Noise and Grounding Diagnostics
- Meter Verification Diagnostics

8800 Series Smart Vortex Flowmeter

Course 2341 CEUs: .7

This course is intended for anyone that is involved with properly installing, wiring, configuring and troubleshooting a Rosemount 8700 Series Smart Magnetic flowmeter. Typical job functions include; maintenance technicians, instrument technicians and instrumentation engineers.

Overview

This 1-day course consists of a blend of lectures and hands-on exercises that cover how to install, configure, and maintain the Rosemount 8800 Series Smart Vortex flowmeter systems. The students will learn the operation and capabilities of the Local Operator Interface & Field Communicator and how to use these tools to perform configuration. Common issues encountered and troubleshooting techniques will also be covered.

Prerequisites

None required. However, basic understanding of the fundamentals of flow measurement, electricity, analog & frequency signal processing are assumed.

Topics

- Explain the Differences and Capabilities of the Rosemount 8800 Series Vortex Flowmeters
- Explain the von Karman Effect and the Principles of Operation of Vortex Flowmeters.
- Identify Vortex Parts and Explain Functionality
- Configure and Test Transmitters using Field Communicator or AMS Device Manager
- Properly Install and Troubleshoot the Rosemount 8800 Series Vortex Flowmeter System

Introduction - 8700 Series Magnetic and 8800 Series Vortex Flowmeters

Course 2394 NEW CEUs: .7

This course is intended for anyone that is involved with properly installing, wiring, configuring and troubleshooting a Rosemount 8700 Series Smart Magnetic and 8800 Series Smart Vortex flowmeters. Typical job functions include; maintenance technicians, instrument technicians and instrumentation engineers who wish to get a very basic orientation for working with these two flowmeters.

Overview

This 1-day course is an abbreviated version of the 2340 and 2341 courses for Rosemount 8700 Series Magnetic and 8800 Vortex meters. It is intended to provide a very basic introduction and overview of the operation, proper installation and configuration of each device using a blend of lectures and brief hands-on exercises. The students will also learn the basic operation of the Local Operator Interface & Field Communicator. A brief overview of troubleshooting techniques will also be covered but not in the same depth as the 1-day class for each flowmeter.

Prerequisites

None required. However, basic understanding of the fundamentals of flow measurement, electricity, analog & frequency signal processing are assumed.

Topics

- Briefly Explain the Key Capabilities of the Rosemount Magnetic and Vortex Flowmeters
- Explain the Basic Principle of Operation of Rosemount's Magnetic and Vortex Flowmeters
- Identify the Parts and Explain Functionality for each Flowmeter
- Explain Key Best Practices for Installing the Rosemount Magnetic and Vortex Flowmeter System
- Perform a Very Basic Configuration and Checkout of each Flowmeter using either the Local Operator Interface, Field Communicator or AMS Device Manager

Intermediate - 8700 Series Magnetic and 8800 Series Vortex Flowmeters

Course 2339 NEW CEUs: 1.4

This course is intended for anyone that is involved with properly installing, wiring, configuring and troubleshooting a Rosemount 8700 Series Smart Magnetic and 8800 Series Smart Vortex flowmeters. Typical job functions include; maintenance technicians, instrument technicians and instrumentation engineers who wish to get a basic orientation for working with these two flowmeters.

Overview

This 2-day course is a combined version of the 2340 and 2341, 1-day, class for Rosemount 8700 Series Magnetic and 8800 Series Vortex meters. It consists of a blend of lectures and hands-on exercises that cover how to install, configure, and maintain the each flowmeter type. The students will learn the operation and capabilities of the Local Operator Interface & HC475 HART Communicator and how to use these tools to perform configuration. Common issues encountered and troubleshooting techniques will also be covered.

Prerequisites

None required. However, basic understanding of the fundamentals of flow measurement, electricity, analog & frequency signal processing are assumed.

Topics

- Explain the Difference and Capabilities of the Rosemount 8700 Series Magnetic Flowmeters and the 8800 Series Vortex Meters
- Explain the Principle of Operation for both Flowmeter Technologies
- Identify Transmitter and Sensor Parts/Explain Functionality
- Configure and Test the Transmitters using the Local Operator Interface and HC475 HART Communicator
- Learn Best Practices to Properly Install/Troubleshoot each Flowmeter Type

Introduction - 8700 Series Magnetic and 8800 Series Vortex Flowmeters with AMS Device Manager

Course 2339A NEW CEUs: 1.4

This course is intended for anyone that is involved with properly installing, wiring, configuring and troubleshooting a Rosemount 8700 Series Smart Magnetic and 8800 Series Smart Vortex flowmeters. Typical job functions include; maintenance technicians, instrument technicians and instrumentation engineers who wish to get a basic orientation for working with these two flowmeters.

Overview

This 2-day course is a combination of the 2340 and 2341, 1-day, courses for the Rosemount 8700 Series Magnetic and 8800 Series Vortex flowmeters. It consists of a blend of lectures and hands-on exercises that cover how to install, configure, and maintain the Magnetic & Vortex flowmeters. The students will learn the operation and capabilities of the Local Operator Interface and how to use AMS Device Manager to perform configuration. Common issues encountered and troubleshooting techniques will also be covered.

Prerequisites

None required. However, basic understanding of the fundamentals of flow measurement, electricity, analog & frequency signal processing are assumed.

Topics

- Explain the Difference and Capabilities of the Rosemount 8700 Series Magnetic Flowmeters and the 8800 Series Vortex Meters
- Explain the Principle of Operation for both Flowmeter Technologies
- Identify Transmitter and Sensor Parts/Explain Functionality
- Configure and Test the Transmitters using AMS Device Manager
- Learn Best Practices to Properly Install/Troubleshoot each Flowmeter

Wireless: Micro Motion Coriolis and Rosemount Smart Magnetic and Vortex Flowmeters

Course 2383 NEW CEUs: .7

This course is intended for anyone that is involved with installing, wiring, configuring and troubleshooting a Micro Motion Coriolis, Rosemount 8700 Magnetic & 8800 Vortex flowmeters with a 775 Wireless THUM. Typical job functions include; maintenance technicians, instrument technicians and instrumentation engineers.

Overview

This 1-day course consists of a blend of lectures and hands-on exercises that cover a basic overview of wireless capabilities with a Micro Motion Coriolis, Rosemount 8700 Series Magnetic and 8800 Series Vortex meters. Based on customer need, the class can be taught for each individual products. The course provides a step by step process for the following: how to install and wire a 775 Smart Wireless THUM to each transmitter, how to configure the THUM, how to configure the 1420 Wireless Gateway to the THUM using AMS Device Manager, and how to add and view the Micro Motion and Rosemount transmitters to the gateway.

Prerequisites-

General understanding of the HART protocol and operation and configuration of a Micro Motion Coriolis, Rosemount 8700 Magnetic and 8800 Vortex meters is assumed.

Topics

- Explain the Fundamentals for how a Micro Motion Coriolis, Rosemount 8700 Series Magnetic & 8800 Series Vortex Flowmeters Work with a 1420 Wireless Gateway and 775 Smart THUM Adapter
- Install and Wire a 775 Smart THUM to Micro Motion and Rosemount Transmitters
- Connect to and Configure the Micro Motion and Rosemount Transmitters to work with a 1420 Wireless Gateway
- Configure a 775 Smart THUM and the Transmitters to Communicate on the Gateway using AMS Device Manager

To enroll in Rosemount courses please call 800-338-8158 or 641-754-3771. For additional contact information refer to the appropriate contact on page 109. Updated dates & locations are available on our website at www.emersonprocess.com/education.

Micro Motion Coriolis and Rosemount Magnetic and Vortex Smart Flowmeters

Course 2380 NEW CEUs: 2.8

This class is intended for anyone that is involved with properly installing, wiring, configuring and troubleshooting a Micro Motion Coriolis and Rosemount Magnetic and Vortex flowmeters. Typical job functions include; maintenance technicians, instrument technicians and instrumentation engineers.

Overview

This 4-day class consists of a blend of lectures and hands-on exercises that cover the installation, configuration, and calibration of the metering system. Students will learn how to work on the Micro Motion Series 1000/2000 transmitters using ProLink III, HC475, and the Series 3000 interface devices the first two days. The 3rd day will cover the same topics for the Smart 8700 Magnetic flowmeter and on day 4 for the Smart 8800 Vortex flowmeter. Students will also learn the approach to uncover the most common problems encountered in the field and the troubleshooting techniques to correct them.

Prerequisites

None required. However, basic understanding of the fundamentals of flow measurement, electricity, analog & frequency signal processing are assumed.

Topics

- Explain the Fundamentals for how a Micro Motion Coriolis, Rosemount Magnetic and Vortex Flowmeters Work and the Function of the Key Components
- Learn the Installation Best Practices for Orienting, Mounting and Wiring the Sensor and Transmitter
- Configure the Metering System to Measure Available Process Variables from the Device for Their Application
- Learn a Step by Step Process to Perform Basic Troubleshooting of the Most Common Meter and Process Issues

Micro Motion Coriolis and Rosemount Smart 8700 Magnetic Flowmeters

Course 2384 NEW CEUs: 1.4

This course is intended for anyone that is involved with properly installing, wiring, configuring and troubleshooting a Micro Motion Coriolis and Rosemount Magnetic flowmeter. Typical job functions include; maintenance technicians, instrument technicians and instrumentation engineers.

Overview

This 2-day course consists of a blend of lectures and hands-on exercises that cover the installation, configuration, calibration checks and troubleshooting. Day 1 - Covers Micro Motion sensors with the Series 1000/2000 transmitters and peripherals. Day 2- covers the Rosemount Smart 8700 Series Magnetic flowmeter. This course includes hands-on exercises. Courses held at customer specified sites can be customized to address specific transmitters and configuration tools. Public registration classes cover a broader range of equipment based on the needs of the attendees.

Prerequisites

None required. However, basic understanding of the fundamentals of flow measurement, electricity, analog & frequency signal processing are assumed.

Topics

- Explain the Principle of Operation for how a Micro Motion Coriolis and Rosemount 8700 Series Magnetic Flowmeter Work and the Function of the Key Components
- Learn the Installation Best Practices for Orienting, Mounting and Wiring the Sensor and Transmitter
- Configure the Metering System to Measure Available Process Variables from the Device for Their Application
- Learn a Step by Step Process to Perform Basic Troubleshooting of the Most Common Meter and Process Issues

Micro Motion Coriolis and Rosemount Smart 8800 Vortex Flowmeters

Course 2387 NEW CEUs: 1.4

This course is intended for anyone that is involved with properly installing, wiring, configuring and troubleshooting a Micro Motion Coriolis and Rosemount Vortex flowmeter. Typical job functions include; maintenance technicians, instrument technicians and instrumentation engineers.

Overview

This 2-day course consists of a blend of lectures and hands-on exercises that cover the installation, configuration, calibration checks and troubleshooting. Day 1 - Covers Micro Motion sensors with the Series 1000/2000 transmitters and peripherals. Day 2- covers the Rosemount Smart 8800 Vortex flowmeter. This course includes hands-on exercises. Courses held at customer specified sites can be customized to address specific transmitters and configuration tools. Public registration classes cover a broader range of equipment based on the needs of the attendees.

Prerequisites

None required. However, basic understanding of the fundamentals of flow measurement, electricity, analog & frequency signal processing are assumed.

Topics

- Explain the Fundamentals for how a Micro Motion Coriolis and Rosemount Smart 8800 Vortex Flowmeter Work and the Function of the Key Components
- Learn the Installation Best Practices for Orienting, Mounting and Wiring the Sensor and Transmitter
- Configure the Metering System to Measure Available Process Variables from the Device for Their Application
- Learn a Step by Step Process to Perform Basic Troubleshooting of the Most Common Meter and Process Issues



Connect from anywhere to Emerson's Virtual Classroom to receive live, instructor led training without the cost and inconvenience of travel.

Virtual Classroom – delivering value based instruction to your desktop via a virtual classroom with live instructor interaction with full access to DeltaV™ or Syncade™ systems. Save time and travel related expenses. Achieve your training goals by utilizing Emerson's Virtual Classroom.

Introduction

Emerson's Virtual Classroom delivers traditional courseware from certified instructors with access to fully functional systems via the internet. Now you can garner the benefits of Emerson's training without leaving your office or home!

Emerson uses Adobe® and GoToMyPC® technology to provide a rich training environment that is easy to use. Emerson's certified Instructors deliver the curriculum through the Adobe Connect meeting room with full audio and video support. You can pose questions directly to the instructor or share them with the entire classroom.

Emerson facilitates your hands-on, learn by doing experience by connecting students directly to a system located in a factory classroom using the GoToMyPC technology. Utilize Emerson's virtual classroom capability to achieve outstanding results without the costs typically associated with factory based training.

Benefits

Convenient: Accomplish your training from work, home or anywhere with an internet connection. With Emerson's Virtual Classroom you have access to your systems, instructors and curriculum from anywhere in the world. Imagine taking a class from the comfort of your home without the lost time and hassles of travel, airports and hotels.

Savings: Today everyone is looking for best cost options without sacrificing quality. Emerson provides the same curriculum from the same professional staff on the same systems you would use if you were taking the class at the factory school.

Quality Instruction: Emerson's Factory certified instructors lead every class using the same learn by doing methodologies. Because each student has access to a system, they can participate in workshops, explore and experiment. Students can also think longer about what they want to say and add their comments when ready.

Content Flexibility: Because the classes originate from the factory, you have greater flexibility in defining special or custom content to suit your training needs. Emerson's Virtual Classroom facilitates multiple subject matter expert availability from one location.

The Following Classes are Available for Virtual Classroom. Call to Discuss Options for Additional Offerings or On-Site Training.

- 7009 - DeltaV Implementation I
- 7012 - DeltaV Operate Continuous
- 7014 - DeltaV Operate Batch
- 7016 - DeltaV Batch Implementation
- 7017 - DeltaV Implementation II
- 7025 - DeltaV Advanced Graphics
- 7201 - DeltaV Advanced Control
- 7202 - DeltaV Model Predictive Control
- 7305 - DeltaV SIS Implementation
- 7080 - Syncade Suite Overview
- 7081 - Syncade Suite Document Control and Archiving
- 7082 - Syncade Suite Training and Development
- 7083 - Syncade Suite Equipment Tracking
- 7084 - Syncade Suite Materials, Inventory and Order Management
- 7095 - Syncade Suite Recipe Authoring 4.0

www.emersonprocess.com/education <Select > Virtual Learning - 800-338-8158 - education@emerson.com

Roxar Flow Measurement

Roxar's training courses are designed to help you run your instrumentation with greater efficiency and productivity. Whether you are looking for installation specific training or generic/advanced product knowledge, Roxar's courses will help you operate, maintain and manage your system.



MPFM - Roxar Multiphase meter

Course ROXMPFM2

Overview

The aim of this 3-day training is to enable participants to take full advantage of the meter in real applications. Upon completion of the course participants should be able to efficiently run Roxar meters on their own including delivering on-site quality reliable data without supervision, having enough self confidence to do normal routine maintenance, fault finding and troubleshooting.

Prerequisites

Some experience with instrumentation would be helpful. In order to gain the maximum benefit of the course we recommend that each participant gets acquainted with Handbook of Multiphase Metering available for download on www.nfogm.no (under documents section) or completes an online course on the same website under NFOGM Metering School.

Topics

- Introduction to Multiphase
 - Metering of the Oil and Gas Production
 - Purpose of the Multiphase Meters
 - Multiphase Flow and Terminology
 - Roxar Multiphase Sensors and Electronics
- Measurement Technology
 - Overview of the Measurement System
 - Meas. Principles Used in Roxar MPFM
 - Determination of the Flow Rates
 - Velocity Measurements
 - Pressure, Temperature and Volume
 - Verification of the Measurements
 - What Factors Have a Vital Importance for Design and Process Calculation?
- Operations
 - Overview of the Operation System
 - Service Console Program (SCP)
 - Communication Set-Up
 - Reference Fluid Parameter Set-Up
 - Well Test Options
 - Overview of Recommended Maintenance
- Maintenance
 - Overview of Recommended Maintenance
 - MPFM Systems Maintenance
 - Calibration and Updates
- PVTx
 - Overview of the Roxar Tempest PVTx Program; Fluid Analysis; Import Tables

Dates/Location/Pricing

Dates/Location/Pricing available upon request. Roxar can make customer tailored courses.

To discuss call 713-334-2222 or email meter.training@roxar.com

SMPFM - Roxar Subsea Multiphase meter

Course ROXSMPFM2

Overview

The aim of this 3-day training is to enable participants to take full advantage of the meter in real applications. Upon completion of the course participants should be able to efficiently run Roxar meters on their own including delivering on-site quality reliable data without supervision, having enough self confidence to do normal routine maintenance, fault finding and troubleshooting.

Prerequisites

Some experience with instrumentation would be helpful. In order to gain the maximum benefit of the course we recommend that each participant gets acquainted with Handbook of Multiphase Metering available for download on www.nfogm.no (under documents section) or completes an online course on the same website under NFOGM Metering School.

Topics

- Introduction to Subsea Multiphase
 - Metering of the Oil and Gas Production
 - Purpose of the Multiphase Meters
 - Multiphase Flow and Terminology
 - Subsea Installations
 - Roxar Multiphase Sensors and Electronics
- Measurement Technology
 - Overview of the Measurement System
 - Measurement Principles in Roxar MPFM
 - Determination of the Flow Rates
 - Velocity Measurements
 - Pressure, Temperature and Volume
 - Verification of the Measurements
 - The Subsea Retrievable Canister (SRC)
 - Redundancy
- Operations
 - Overview of the Operation System
 - Service Console Program (SCP)
 - Communication Set-Up; Reference Fluid Parameter Set-Up; Well Test Options
 - Overview of Recommended Maintenance
- Maintenance
 - Overview of recommended maintenance
 - MPFM systems maintenance
 - Calibration; Redundancy Set-Up; Updates
- PVTx
 - Overview - Roxar Tempest PVTx Program
 - Fluid analysis; Import tables

Dates/Location/Pricing

Dates/Location/Pricing available upon request. Roxar can make customer tailored courses.

To discuss call 713-334-2222 or email meter.training@roxar.com

SAM - Roxar Sand monitor

Course ROXSAM2

Overview

The aim of this 2-day training is to enable participants to take full advantage of the meter in real applications. Upon completion of the course participants should be able to efficiently run Roxar meters on their own including delivering on-site quality reliable data without supervision, having enough self confidence to do normal routine maintenance, fault finding and troubleshooting.

Prerequisites

Some experience with instrumentation would be helpful.

Topics

- Introduction to Sand Monitor
 - Why Do We Need Sand Detection System?
 - Product Description (Hardware)
 - Sand Detection System Enclosure
 - History
 - Challenges
 - Integration with Other Products
- Measurement Technology
 - How Do We Measure Sand?
 - Sand Detection Requirements
 - Process Data Interface
 - Sand Rate Calculation
 - Sand Detector
 - Accuracy
- Operations
 - Software
 - Configuration of the CIU
 - Process Data Interface
 - Alarm Settings Interface
 - Data Logging
 - Interpretation of Signals
 - Necessary Maintenance
- Maintenance
 - Installation
 - Communication
 - Calibration
 - Filtering Settings
 - Ownership
 - Preventive Maintenance
 - Maintenance Calibration
 - Hardware Maintenance

Dates/Location/Pricing

Dates/Location/Pricing available upon request. Roxar can make customer tailored courses.

To discuss call 713-334-2222 or email meter.training@roxar.com

WGM - Roxar Wetgas meter

Course ROXWGM2

Overview

The aim of this 2-day training is to enable participants to take full advantage of the meter in real applications. Upon completion of the course participants should be able to efficiently run Roxar meters on their own including delivering on-site quality reliable data without supervision, having enough self confidence to do normal routine maintenance, fault finding and troubleshooting.

Prerequisites

Some experience with instrumentation would be helpful.

Topics

- Introduction of Wetgas Metering and Technology
 - Why Wetgas Metering
 - Terminology
 - Flow Regimes
 - Why use WGM Instead of Multiphase Meters
 - Typical Installations Subsea/Topside
 - Description of the Different Parts of the Meter
- Measurement Technology
 - How is Wetgas Measured
 - Operational Modes
 - Measurement Requirements/Range (IDS)
 - Installing the Meter
 - Transmitter Location
 - Meter Accuracy
- Operations
 - Communicating with the Meter
 - Communication Protocols
 - Software
 - Calibration
 - Configuration
- Maintenance
 - Periodic Checks
 - Topside/Subsea
 - Monthly and Annual Checks
 - Fixed values for Communication
 - Troubleshooting
 - Case Studies of Known Scenarios/Problems

Dates/Location/Pricing

Dates/Location/Pricing available upon request. Roxar can make customer tailored courses.

To discuss call 713-334-2222 or email meter.training@roxar.com

WCM - Roxar Watercut meter

Course ROXWCM2

Overview

The aim of this 2-day training is to enable participants to take full advantage of the meter in real applications. Upon completion of the course participants should be able to efficiently run Roxar meters on their own including delivering on-site quality reliable data without supervision, having enough self confidence to do normal routine maintenance, fault finding and troubleshooting.

Prerequisites Some experience with instrumentation would be helpful. In order to gain the maximum benefit of the course we recommend that each participant gets acquainted with Handbook of Water Fraction Metering available for download on www.nfोगm.no (under documents section).

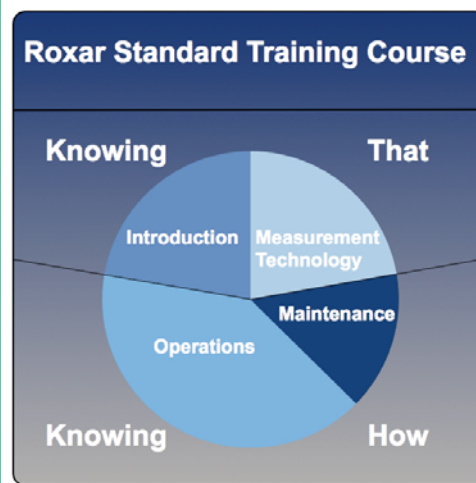
Topics

- Intro of Watercut Metering and Technology
 - Why Measure Watercut
 - Watercut Metering Challenges/Requirements
 - Technology for Watercut Measurement
- Measurement Technology
 - How to Measure Watercut
 - Installation
 - Microwave Signal Path
 - Entrapment of Microwaves in a Pipe
 - Microwave Resonance
 - Permittivity of Oil and Water
 - Water Continuous and Oil Continuous Phase
 - Calculations
 - Measurement Uncertainty, Initial Explanation
- Operations
 - Connecting to the Meter
 - Going into the Main Menu
 - Different Settings of the Meter
 - Starting Measurement
 - Inline Calibration of a Meter
 - Measurement Uncertainty
- Maintenance
 - Overview of Recommended Maintenance
 - Diagnostics and Logging
 - Reading the Settings Overview
 - Record a Plot of the Microwave Electronics
 - Common Error Messages
 - Detecting if a Meter is Gas Filled
 - Analysis and Filing
 - Downloading New Code to a Meter
 - Erasing the Battery Backed RAM in a Meter
 - Troubleshooting the Temperature Transmitter
 - Practical Exercises

Dates/Location/Pricing

Dates/Location/Pricing available upon request. Roxar can make customer tailored courses.

To discuss call 713-334-2222 or email meter.training@roxar.com



To enroll in Roxar courses please call meter.training@roxar.com or 713-334-2222. For additional contact information refer to the appropriate contact on page 109. Updated dates & locations are available on our website at www.emersonprocess.com/education.

Bettis Gas/Hydraulic Product Servicing

Course VA101 CEUs: 2.8

Overview This 4-day course uses classroom style lectures and hands-on experience with working models to teach the student to:

- assemble, install, operate and maintain a gas/hydraulic actuator
- use troubleshooting techniques and tests to identify problems in gas/hydraulic systems, and perform routine maintenance and emergency repairs on each component
- install any Bettis control device on the corresponding actuator, connect calibration equipment, and carry out set-up and calibration procedures
- adapt and install control upgrade or modification kits including all tubing connections and final adjustments
- identify graphic fluid schematic symbols, match to the actual control device, and integrate the symbols into a functioning relationship

Prerequisites

Students should be involved with the application, service or maintenance of Bettis Canada gas/hydraulic products.

Topics

- Gas/Hydraulic Actuators
- Gas/Hydraulic Control Systems
- Gas/Hydraulic Control System Accessories
- Control Applications
- Control Component Calibration
- New Products

Price/Location/Start Date:

Mansfield, OH Call 419-529-4311 to Discuss
Waller, TX Call 281-727-5300 to Discuss



Bettis PressureGuard & Linear Actuators, Control Systems & Accessories & Multiport Flow Selector Products

Course VA102 CEUs: 2.1

Overview This 3-day course provides an introduction to the range of valve actuators, control components and systems manufactured by Bettis. In addition to discussing product features and benefits, students will be given a broad overview of the valve automation industry and provided with training on product selection and applications.

Prerequisites

Involved with the purchase, application and marketing or sales of products.

Topics

- PressureGuard (Self-Contained Hydraulic) Control System Overview
- LineGuard Electronic Linebreak System
- Non-API Linear Actuator Selection/Sizing
- API Linear Actuator Selection/Sizing
- Multiport Flow Selectors Overview
- GVO Linear Actuator

Price/Location/Start Date:

Mansfield, OH Call 419-529-4311 to Discuss
Waller, TX Call 281-727-5300 to Discuss

Bettis Rack & Pinion & Scotch-Yoke Product Servicing

Course VA103 CEUs: 2.1

Overview

This 3-day class provides comprehensive information concerning the installation, operation and maintenance of all Bettis Waller products.

Prerequisites

Involved with the purchase / application / marketing or sales / service of products.

Topics

- Valve Automation Center Contract Review
- Installation/Maintenance Instruction Manuals
- Product Serial Numbers Review
- Service Procedure Index Review
- General Operating/Maintenance Instructions
- General servicing information on RPB, RPC, D, CB, CBA 300, HD, T and G-Series Actuators
- Conversion of Fail-Close Spring-Return G-Series Actuators to Fail-Open Spring-Return
- Field Service Work Performed by VAC's, Bettis Waller Procedure Review
- 2-1/2 days of Practical Exercises Involving the Disassembly/Reassembling of Products

Price/Location/Start Date:

Waller, TX Call 281-727-5300 to Discuss

Bettis Rack & Pinion & Scotch-Yoke Products

Course VA104 CEUs: 2.8

Overview This 4-day course provides an introduction to the range of pneumatic and hydraulic valve actuators manufactured by Bettis in their Waller, Texas facility. In addition to discussing product features and benefits, students will be given a broad overview of the valve automation industry and provided with training on product selection and applications. Common pneumatic and hydraulic control components and systems will also be discussed; and a review of competitive products.

Prerequisites Involved with the purchase/application/marketing or sales of products.

Topics

- D-Series Actuators Overview
- CBA-Series Actuators Overview
- CBA 300-Series Actuators Overview
- G-Series Actuators Overview
- Bettis Electronic Data Formats Overview
- Torque Mechanisms Overview
- Manual Overrides Overview
- Actuator Selection/Sizing
- Introduction to Valve Automation Sizing Tool (VAST)
- Common Control Components/Control System
- Valve Mounting Hardware Overview
- Competitor Product Comparisons
- General Practical Work

Price/Location/Start Date:

Mansfield, OH Call 419-529-4311 to Discuss
Waller, TX Call 281-727-5300 to Discuss



Dantorque Products

Course VA106 CEUs: 1.4

Overview This 2-day product training course provides an overview of the valve automation products manufactured by Dantorque. Primarily focused on product features & benefits, sizing/selection and applications; service/ maintenance training can also be provided if requested in adv. of the class. Classes will be tailored to meet specific needs.

Prerequisites Students should be involved with the purchase, application, marketing, sales or service/maintenance of Dantorque products.

Topics

- Introduction
- Overview Dantorque Actuators
- Onshore, Offshore and Subsea Applications
- General Control Options
- Subsea Control Options
- ROV Overrides
- Actuator Sizing/Selection
- Question and Answer Session

Price/Location/Start Date:

This training can be tailored to a specific project application and is usually conducted at the customer's location. Please call Paul Warren, Product Manager at 419-529-4311.

El-O-Matic Products

Course VA107 CEUs: 2.1

Overview This 3-day class provides information on the ranges of pneumatic and electric actuators and accessories available from El-O-Matic. Detailed information on electric actuator module boards/ bus communication options will be addressed.

Prerequisites Students should be involved with the application, marketing, sales or service/ maintenance of El-O-Matic products.

Topics

- Electric Actuator Series (ELS/EL/ELD & ELQ)
 - Identification of Components; - Basic Bench Testing; - Installation Options;
 - Actuator Sizing/Selection; - Control Options;
 - Hands-on Training Covering Installation of Module Boards for Different Control Functionality; - Bus Communication Options;
 - El-O-Matic Sizing Program
- Pneumatic Actuator Series (E & P Series)
 - History; - Identification of Components;
 - Comparison of E & P Series Actuator;
 - 180° Rotation Actuators; - Actuator Sizing/Selection; - Available Accessories
 - Hands-on Training Including; Spring Changes, Seal Changes, Travel Stop Adjustment and Mounting of Accessories;
 - El-O-Matic Sizing
- QA Systems, Functions, RMA's and Customer Complaint Handling

Price/Location/Start Date:

Tampa Bay, FL Call 813-630-2255 to Discuss

Hytork Products

Course VA108 CEUs: 2.1

Overview

This 3-day class provides a solid grounding in valve automation solutions in general with detailed and specific information given on the range of actuators and control accessories available from Hytork. Classes are tailored to fit specific student requirements.

Prerequisites

Students should be involved with the purchase, application, marketing, sales or service/maintenance of Hytork products.

Topics

- Overview of Hytork
- Key Accounts and Markets
- Pneumatic Actuators, History, Theory and Different Types
- Comparison of Pneumatic Actuators to Electric, Hydraulic and Electro-Hydraulic Designs
- Advantages of the Rack & Pinion Design
- ISO Standards
- General Valve Automation Applications
- Hytork Actuator Variations and Evolution
- Valve Automation Accessories Including Limit Switches, Solenoid Valves, Speed Control Valves and Valve Mounting Options
- Mounting of Control Accessories
- Hytork Product Features and Benefits
- General Valve Types/Torque Characteristics
- Actuator Sizing Techniques, Test Questions
- Hytork Actuator Sizing Program
- Hytork Drawing Types and Procedures
- QA Systems, Functions, RMA's and Customer Complaint Handling
- Hytork Product Warranties
- Price Book Review
- Hands-on Review of Competitive Products
- Selling and Marketing Techniques
- Hands-on Actuator Assembly, Disassembly, Mounting and End-Stop Adjustment
- Question and Answer Session
- Final Test

Price/Location/Start Date:

Tampa Bay, FL Call 813-630-2255 to Discuss

Shafer Products

Course VA109 CEUs: 2.8

Overview

This 4-day product training course provides an overview of the valve automation products manufactured by Shafer. Primarily focused on product features & benefits, sizing/selection and applications; service and maintenance training can also be provided if requested in advance of the class. In addition, an overview of Dantorque products can be included in the class if requested.

Prerequisites

Students should be involved with the purchase, application, marketing, sales or service/ maintenance of Shafer products.

Topics

- Introduction and Company History
- Introduction Inside Sales Organization/Basic Funct.
- Plant Tour
- Gas Pipeline Valve/Actuator Applications
- Rotary Vane Actuators
- Assembly of Rotary Vane and Travel Adjustments
- Poppet Block, Hand Pump
- Local Manual Control/Control Schematics
- Control Functions and Components:
 - High & Low Pressure Shutoff; - 2-Way Electric & Failsafe; - ESD; - Pneumatic Linebreak Devices
- Limit Switches and Solenoid Valves
- Rotary Actuator Sizing - Theory and Ex
- Subsea and High Speed Rotary Vane Actuators
- Valve Position System
- LineGuard 2100
- Linear Actuators
- Shafer Service Organization
- Installation and Routine Maintenance of Actuators
- Pricing, Project Pricing & Commission Structure
- Pressure Equipment and Bookings Reports
- Pressure Equipment Directive (PED)
- Quality Assurance; Open Shop Time

Price/Location/Start Date:

This training can be tailored to a specific project application and is usually conducted at the customer's location. Please call Paul Warren, Product Manager at 419-529-4311.

To enroll in Valve Automation courses reference phone number under course description. For additional contact information refer to the appropriate contact on page 109. Updated dates & locations are available on our website at www.emersonprocess.com/education.

FieldQ Products**Course VA110****Overview**

This 3-day class provides the knowledge required for the student to understand, troubleshoot and even repair the Valve Automation FieldQ actuator and modules. The class covers the full range of the actuators and the modules used to interface to the actuator. Classes are held periodically but can be tailored to fit specific needs of the students in attendance.

Prerequisites

Students should be involved with the purchase, application, marketing, sales, or / service/maintenance of the FieldQ Actuation System

Topics

- Basic Product Overview
 - Actuator, Control Modules, Pneumatic Modules
- Introduction to Actuators
 - Rack & Pinion Operation, FieldQ Features/Benefits, Data Sheets
- Introduction to Modules
 - General Features and Benefits, Types, Construction, Functionality
 - Hands on with Conventional, Smart, and Bus Modules
- Field Topics
 - Installation, Maintenance, and Troubleshooting
- Sales Training
 - Applications, Pricing, Configurations
- QA Systems, Functions, RMA's and Customer Complaint Handling

Training is set up to include hours of learning the FieldQ product family via hands on activities. In fact, students will often spend more time learning in the lab than being lectured

Price/Location/Start Date:

This training is offered in a standard training class or can be tailored to fit your specific needs including customer focused training in Tampa, on site training, and an adjustable schedule via an abbreviated agenda. Please call Valve Automation in Tampa Florida at (813) 630-2255 and ask for the FieldQ Training Specialist to discuss.

Series 2000 Actuator Maintenance**Course VA111****Overview**

This 32-hour program presents the fundamental aspects of Series 2000 actuator maintenance. Attendees are presented with the basics of actuators and how they operate valves. Basic components and assemblies are studied through actual disassembly and reassembly of an actuator. In that mechanical operation is learned. Each student will learn how to set travel limits, torque limits and operate an actuator on a variety of valves. Model number interpretation, how to order parts from local distributors, Control Package wiring diagram interpretation and basic maintenance are all presented in a combination hands-on / instructor led lecture format. At the end of the program all students complete a written performance based evaluation prior to leaving. Any original course documentation and certificates are provided to all attendees for company records at the end of the program.

Prerequisites

Students interested in attending this program should have a background or equivalent work experience in basic mechanical and electrical practices and principles. No previous service experience necessary.

Topics

- Identify the Basic Components and Assemblies of a Series 2000 Actuator by Function and Operation
- Disassemble and Reassemble a Series 2000 Actuator with Installed Controls:
 - Multi-Turn Valve and Part Turn Valve
- Identify EIM Control Packages by Function with the Aide of a Control-Wiring Diagram
- Demonstrate the Correct Method to Set Position and Torque Limits:
 - Multi-Turn Valve and Part Turn Valve
- Demonstrate the Operation of a Modulating Unit with Futronic II
- Perform Basic Maintenance Associated with the Operation of an Actuator

Price/Location/Start Date:

Missouri City, TX
Call 281-499-1561 to Discuss

Gold Seal Service Training - Level II TEC2000 Maintenance and Operation**Course VA112****Overview**

This 48-hour program presents a fundamental overview of the construction, assembly, hardware, software and configuration of a TEC2000 actuator. Students attending this program will demonstrate an ability to identify actuator hardware, components and assemblies. Students will interconnect various control configurations for the TEC2000 units and prove actuator operation. All students will demonstrate the ability to setup, configure, check and verify operation of various actuator configurations using appropriate hardware or software.

Prerequisites

Students planning on attending this program should have a minimum of 3 years field service experience and have previously attended the Gold Seal Service Training Program – Level 1 and have a working knowledge of MS Windows. Each student MUST have a strong background in the mechanical operation and electrical operation of EIM products. Other attendees with a solid background in electrical controls [including microprocessor basics] are encouraged to attend.

Topics

- Identify the Basic Components and Assemblies of a TEC2000 Non-Intrusive Actuator by Function, Configuration and Operation
- Disassemble and Reassemble a TEC2000 Actuator
- Customize the Configuration of a TEC2000 Actuator
- Wiring Options
- Application
- Troubleshoot Start-up Problems Associated with Installation, Configuration and Operation of Various Control and Actuator Combinations
- Demonstrate How to Upgrade the Service Pack for a TEC2000 Actuator

Price/Location/Start Date:

Missouri City, TX
Call 281-499-1561 to Discuss

AUTOMATION SYSTEMS



Automation Systems are a key component of the process manufacturers' automation strategy. Gaining the greatest advantage with today's digital automation technologies requires the most up-to-date skills. Emerson's Educational Services helps shorten the learning curve and keep skills tuned so customers can operate their plants most efficiently.

We deliver what you need to know about the breadth and depth of Emerson's award-winning automation Systems. Everything from their specific operation in your process to how you can most smoothly evolve from an older system to powerful new capabilities. These courses help deliver on Emerson's promise — Consider it Solved.

DeltaV™	76
Ovation®	86
PROVOX®	89
PROVOX® On-Demand	94
RS3™ Systems	95
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Generator Control	98
WDPF®/Generator Exciter Control	98



Virtual Classroom Available

Introducing Virtual Classroom, details on page 85. Courses can be arranged to fit your schedule.

On-Site Training can also be scheduled in your area or at your site. Please call to discuss options at 800-338-8158 or 641-754-3771.



LEARNING PATH

Engineers & System Administrators

Core Competencies

- **Continuous: 7009, DeltaV Implementation I**
- **Batch: 7009, DeltaV Implementation I and 7016, DeltaV Systems Batch Implementation**
- **Administrators: 7027 DeltaV Systems Administration Windows 7/Server 2008**

Additional Competencies

- **7201, DeltaV Advanced and 7202, DeltaV Model Predictive Control**
- **7037, Communication Interfaces with the DeltaV System**
- **7032, FIELDBUS Systems & Devices**
- **7018, DeltaV Hardware & Troubleshooting**
- **7020, AMS Device Manager**
- **7017, DeltaV Implementation II**
- **7025, DeltaV Advanced Graphics**
- **e7045, eLearning: Features Training on DeltaV Analyze 2.0**
- **7305, DeltaV SIS Implementation**
- **eV113, DeltaV v11.3 New Features**

Managers

Core Competencies

- **7101, PlantWeb/DeltaV Introduction**

Plant Operators

Core Competencies

- **Continuous: 7012, DeltaV Operate Interface for Continuous Control or e7012, eLearning: DeltaV Operator Interface for Continuous Control**
- **Batch: 7014, DeltaV Operator Interface for Batch or e7014, eLearning: DeltaV Operator Interface for Batch Control**
- **DeltaV Operator Training Solutions (OTS)**

Maintenance Technicians

Core Competencies

- **7018, DeltaV Hardware & Troubleshooting**

Additional Competencies

- **Continuous: 7009, DeltaV Implementation I**
- **Batch: 7016, DeltaV Systems Batch Implementation**
- **7030, Fieldbus Devices or 7032, Fieldbus Systems & Devices**
- **7037, Communication Bus Interfaces with the DeltaV System**
- **5590, Power Quality and Grounding for Electronic Systems**
- **7303, DeltaV Safety Instrumented Systems (SIS) Maintenance**

To enroll in DeltaV courses or for more information, please call:
800-338-8158 or 641-754-3771

PlantWeb/DeltaV Introduction

Course 7101 CEUs: 2.1

This course is for individuals needing an introduction to the technology and concepts used in the new generation of process control systems and safety systems.

Overview

Students who complete this 3-day course will be able to:

- use and apply PlantWeb terminology and acronyms
- understand the functions of DeltaV hardware components
- understand the capabilities of DeltaV software applications
- understand the Foundation™ fieldbus technology
- understand AMS Device Manager software
- understand the DeltaV SIS architecture.

Perform basic workstation operations including accessing displays, interpreting faceplates and accessing modules to make process changes, responding to alarms and observing/changing tunable configuration parameters.

Prerequisites

None.

Topics

- DeltaV System Description
- Analog Control Modules
- Discrete Control Modules
- FOUNDATION™ fieldbus
- AMS Device Manager
- DeltaV SIS Overview
- SIFs in DeltaV
- DeltaV SIS Operations

DeltaV Implementation I**Course 7009 CEUs: 3.2**

This course is designed for individuals responsible for configuring and commissioning a DeltaV system.

Overview

This 4-1/2 day course covers a complete DeltaV system implementation. The student will be able to define system capabilities, define nodes, configure continuous and sequential control strategies, operate the system and define users and security.

Prerequisites

Microsoft Windows experience. It is recommended that prospective attendees new to process Automation Systems attend PlantWeb/ DeltaV Introduction, Course 7101, or DeltaV Hardware & Troubleshooting, Course 7018

Topics

- System Overview
- DeltaV Explorer
- Control Modules
- Control Studio
- Motor Control
- Regulatory Control
- DeltaV Operate
- System Operation
- Alarms & Process History View
- Sequential Function Charts
- Phase Logic Modules
- Security
- Alarm Help
- Electronic Marshalling (CHARMS)

DeltaV Systems Batch Implementation**Course 7016 CEUs: 3.2**

This course is designed for individuals responsible for configuring and commissioning DeltaV Batch software.

Overview

This 4-1/2 day course covers the implementation of a complete batch application. A process simulator will provide a batch application. Students will use DeltaV Batch software to configure recipe entities including, Aliasing, Equipment Trains, Dynamic Unit Allocation, Phase Logic, Operations and Unit Procedures. Equipment entities will also be configured including, Units modules and Process cells.

Prerequisites Course 7009, DeltaV Implementation I

Topics

- Batch Overview
- Unit Phase
- Alias Definition
- Unit Module
- Process Cell
- Class Based Control Modules
- Class Based Equipment Modules
- Operation
- Unit Procedure
- Procedure
- Equipment Trains
- Unit Aliasing
- Dynamic Unit Allocation

DeltaV Implementation II**Course 7017 CEUs: 3.2**

This sequential course is for users that have completed course 7009.

Overview

This 4-1/2 day course is for process control engineers responsible for configuring the DeltaV system. Advanced topics will be covered including displays, function blocks, and configuration tips.

Prerequisites

Course 7009, DeltaV Implementation I

Topics

- Function Block Structure
- HART Inputs and Outputs
- Analog Control Blocks
- DeltaV Tune with InSight
- Device Control Options
- Class Based Control Modules
- Expressions
- Unit Alarms
- Multi-Dimensional (Array Parameter)
- Equipment Modules
- Display Environment
- Custom Faceplates
- Custom Dynamos
- HART Device Alarms

**Virtual Classroom Available**

Introducing Virtual Classroom, details on page 85. Courses can be arranged to fit your schedule.

On-Site Training can also be scheduled in your area or at your site. Please call to discuss options at 800-338-8158 or 641-754-3771.

To enroll in DeltaV courses please call 800-338-8158 or 641-754-3771. For additional contact information refer to the appropriate contact on page 109. Updated dates & locations are available on our website at www.emersonprocess.com/education.

DeltaV Advanced Graphics

Course 7025 CEUs: 3.2



Overview

This 4-1/2 day course is for process control engineers responsible for configuring advanced functionality in the DeltaV user interface. This course expands on graphic topics covered in both the DeltaV Implementation course 7009 and DeltaV Implementation II course 7017.

Prerequisites

Course 7009, DeltaV Implementation I

Topics

- Visual Basic Primer
- Forms
- Modules
- Schedules
- User Preferences
- Picture Sizing
- Environment Customization
- Custom Faceplates
- Function Block Faceplates
- FRS Functions
- Pop Up Menus
- Color Threshold Tables
- Custom Dynamos
- Tag Groups
- Key Macro Editor
- Theme Dynamos



Virtual Classroom Available

Introducing Virtual Classroom, details on page 85. Courses can be arranged to fit your schedule.

On-Site Training can also be scheduled in your area or at your site. Please call to discuss options at 800-338-8158 or 641-754-3771.

eLearning: Features Training on DeltaV Analyze 2.0

Course e7045 NEW CEUs: .2



Audience

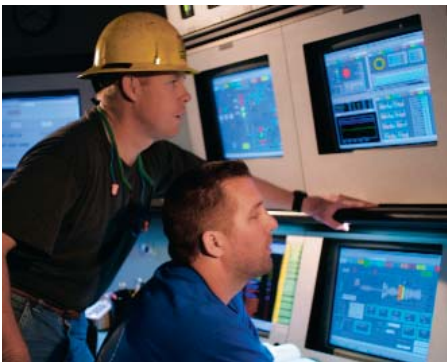
This course is for personnel who will be using DeltaV Analyze in their alarm management program. This is an 2-hour on-line course with DeltaV screens including audio presentations and quizzes.

Topics

- DeltaV Analyze Overview
- DeltaV Analyze Administration Features
- How to Create a Bookmark
- How to Create an Alarm Statistics Report

www.emersonprocess.com/education
Quick Links - Click to eStore: Blended Learning

Note: Course access is 3 months



DeltaV Advanced Control

Course 7201 CEUs: 3.2



Overview

This 4-1/2 day course introduces students to the advanced control tools available within DeltaV and how they may be used to improve plant operations. The principal technology that is utilized in each product will be discussed. The areas of improvement that may be achieved will be detailed. Also, each student will gain hands on experience with these tools in class exercises based on realistic process simulations.

Prerequisites

Courses 7101, PlantWeb/DeltaV Intro. or 7009, DeltaV Implementation I or equivalent field experience.

Topics

- The Control Foundation in DeltaV
 - Traditional Tools e.g. Override, Cascade, Ratio
 - Improvements Provided by Advanced Control
- DeltaV Inspect with InSight
 - Detection of Abnormal Conditions
 - Performance Indices
 - Performance Reports
- DeltaV Tune with InSight
 - Tuning Response
 - Process Learning
 - Adaptive Tuning
 - Adaptive Control
- DeltaV Fuzzy
 - Principles of Logic Control
 - FLC Function Block, Tuning
- DeltaV Predict
 - MPC for Multi-Variable Control
 - Model Identification, Data Screening
 - Simulation of Response, Tuning
- DeltaV Neural
 - Creation of Virtual Sensor
 - Data Screening, Training
- DeltaV Simulate Suite
 - Process Simulation
 - Simulate Pro

Virtual Training Available, Call to Schedule.

DeltaV Model Predictive Control**Course 7202 CEUs: 2.1****Overview**

This 3-day course is designed for process and control engineers who are applying DeltaV Predict and Predict Pro. It provides practical examples of how to determine the benefits of MPC application and how this control may be used to meet specific application requirements. Students will gain hands on experience through lab exercises based on realistic dynamic process simulations.

Prerequisites

7201 DeltaV Advanced Control

Topics

- How to Justify an MPC Project
 - Evaluating the Cost of Process Variation
 - Estimating the Reduction in Variation that is Possible Using MPC
 - Calculating the Benefit of Maximizing Throughput When Plant Production is Restricted by Input Limits or Measurable Constraint
- Meeting Application Requirements
 - Insuring Disturbance Inputs are Independent of Other Process Inputs
 - Meeting Control Requirements when the Response Times are Very Different
 - Understanding the Design and Testing of an Integrating Process
- Tailoring Control Performance
 - Placing more Emphasis on Selected Control or Constraint Parameters
 - Improving Control Performance when the Process is Deadtime Dominant
 - Compensating for Large Changes in Process Gain or Dynamics
 - Minimizing the Impact of Process Noise on Control Performance
- Predict Pro- Applying Predict Pro on Large Processes; - Optimizing with Predict Pro

Virtual Training Available, Call to Schedule.

DeltaV Operate for PROVOX**Course 7060 CEUs: 2.8**

This course is designed for process control engineers and senior maintenance technicians, using the DeltaV Operate for PROVOX console with either SR90 or SRX Controller and using ENVOX to configure the controller and console as well as creating the console displays.

Overview

This 4-day course will cover the complete hardware and software implementation for the DeltaV Operate for PROVOX console. Upon completion of this course the student will be able to install the hardware and define system capabilities, define nodes configure the system for continuous control, operate the system and define users and security.

Prerequisites

Any one of the following courses: 5360, 5370 or 5390.

Topics

- DeltaV Operate for PROVOX Console Hardware and Software Overview
- DeltaV Operate for PROVOX Common Console Configuration Using ENVOX
- DeltaV Architecture and Data Structure
- Operating the DeltaV Operate for PROVOX
- Display Configuration
- User Definition and Privileges
- Event Journal
- Software Installation Guidelines
- Hardware Installation Guidelines

Communication Interfaces with the DeltaV™ System**Course 7037 CEUs: 2.5**

This course is for individuals responsible for interfacing with DeviceNet, AS-i, Profibus DP HART and serial communication busses to a DeltaV™ scalable system.

Overview

This 3-1/2 day course covers the integration of fieldbus compliant devices using DeltaV systems. Upon completion of the course the student will be able to install, configure and verify proper operations of AS-i, Profibus DP, DeviceNet and HART devices, including proper wiring practices. The AMS Intelligent Device Manager will be used to configure HART instruments.

Prerequisites

Course 7009, DeltaV Implementation or Course 7018, DeltaV Hardware and Troubleshooting. The 375/475 Field Communicator will be available for the students.

Topics

- HART Overview
- Configuring DeltaV Control Modules with Wired HART
- Configuring HART Device with AMS Intelligent Device Manager and/or Rosemount 375/475 Handheld Communicator
- Serial Interface Overview
- Configuring DeltaV and Serial Interface Card
- Actuator Sensor Interface (AS-i) Overview
- AS-i: Wiring and Installation
- Assembling and Configuring AS-i Network with DeltaV
- Profibus DP Overview



To enroll in DeltaV courses please call 800-338-8158 or 641-754-3771.

For additional contact information refer to the appropriate contact on page 109. Updated dates & locations are available on our website at www.emersonprocess.com/education.



eLearning: DeltaV 11.3 Features

Course eV11.3 CEUs: 1.0



Overview

Gain access to 24 separate technical training modules for an entire year covering the new DeltaV v11.3 technologies. Training includes the new Human Centered Design features and how to implement.

Available via the internet, this training package helps you keep your training level and knowledge of the DeltaV platform current. The program also provides 1.0 CEU without travel or prerequisites.

Each learning module provides insight and clarity into the new features and functions available in the DeltaV v11.3 software.

This training helps ensure you leverage your technology investment and understand the capabilities of the tools at your disposal.

Address the greatest challenge to staying current in difficult economic times by utilizing this affordable and effective learning platform to discover the new features available from Emerson's PlantWeb® technology.

www.emersonprocess.com/education

Quick Links - Click to eStore: Blended Learning

Note: Course access is 3 months

DeltaV Systems Administration XP/Server 2003

Course 7024 CEUs: 3.2

Overview

This course is designed for system administrators that will be installing, commissioning and implementing a DeltaV system running on the XP operating system and Windows Server 2003. The course is 4-1/2 days in length.

Prerequisites

Course 7009, DeltaV Implementation I, or Course 7018, DeltaV Hardware and Troubleshooting

Topics

- Overview/Review of System Components and Topologies
- Installation Checklist of the XP Operating System
- Installation of the DeltaV Software Components
- DeltaV Control Networks
- DeltaV Domains and Workgroups
- Users and Securities
- Upgrading Hardware and Software
- Backup and Restore Procedures
- Importing/Exporting
- Process Historian Administration
- DeltaV Zones

DeltaV Systems Administration - Windows 7/Server 2008

Course 7027 CEUs: 3.2

Overview

This 4-1/2 day course is designed for system engineers and administrators responsible for installing, commissioning, and managing a DeltaV system running on the Windows 7 operating system and Windows Server 2008.

Highly Recommended

Course 7009, DeltaV Implementation I, or Course 7018, DeltaV Hardware and Troubleshooting

Topics

- Overview/Review of System Components and Topologies
- Installation Checklist of the Windows 7 and Windows Server 2008 Operating Systems
- Installation of the DeltaV Software Components
- DeltaV Control Networks and Remote Access
- DeltaV Domains and Workgroups
- User Administration and Network Security
- Upgrading Hardware and Software
- Backup and Restore Procedures
- Importing/Exporting
- DeltaV Zones

DeltaV Hardware & Troubleshooting

Course 7018 CEUs: 2.8

This course is recommended for instrumentation and maintenance technicians, managers, and configuration engineers who need to know about DeltaV hardware. It provides an overview of the DeltaV Control Network, M- and S-series hardware, and software applications. Upon completion, you will be familiar with the hardware and be able to perform troubleshooting techniques.

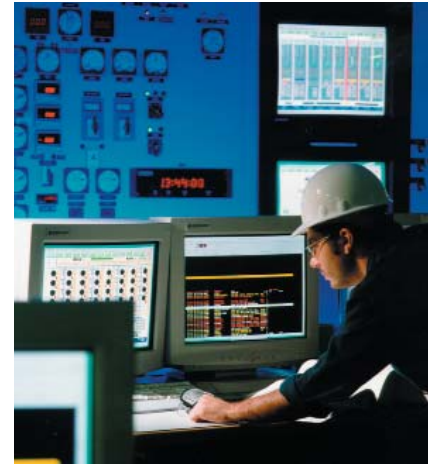
Overview

This 4-day course focuses on the hardware components that make up the DeltaV system: M-series controllers and I/O, S-series controllers and I/O (including CHARMs), and DeltaV Smart Switches. Using a combination of lectures and workshops, you will learn how to use operator and diagnostic tools to identify and locate hardware-related fault conditions. Workshops provide the opportunity to disassemble and reassemble the M- and S-series hardware and return the system to an operating state. If your systems include bus technologies such as Foundation Fieldbus, we recommend courses 7030, 7032, or 7037. The 7018 course satisfies the prerequisite requirement for these bus course (except 7032).

Prerequisites Windows Experience

Topics

- DeltaV Overview
- Operator Alarms
- DeltaV Diagnostics
- DeltaV Smart Switches
- DeltaV I/O Cards and Carriers
- Controllers and Power Supplies
- Electronic Marshalling (CHARMs)
- HART I/O
- DeltaV and AMS Suite Intelligent Device Manager
- Redundant I/O



To enroll in DeltaV courses please call 800-338-8158 or 641-754-3771. For additional contact information refer to the appropriate contact on page 109. Updated dates & locations are available on our website at www.emersonprocess.com/education.

Power Quality and Grounding for Electronic Systems

Course 5590 CEUs: 1.4

This 2-day course is designed for personnel involved with the planning, installation and maintenance of DeltaV digital automation system and provides essential knowledge regarding the power and grounding system for DeltaV equipment.

Overview

This course focuses on specific power and grounding requirements of a control system. You will learn:

- how to conduct site verifications
- how to audit using "hands-on" testing labs
- to detect power and grounding problems on existing sites

Prerequisites

A working knowledge of electronics and AC power basics is required.

Topics

- Review of Power Basics
- Power System Measurements
- Low Voltage Power Systems
- Power System Grounding
- Earthing vs. Grounding
- Connection to Earth
- Equipment Grounding
- Code Requirements
- Building Power Distribution
- Feeders and Branch Circuits
- Separately Derived Systems
- Power & Grounding for the DeltaV System
- Single Point Grounding
- Isolated Ground Installations
- Dedicated Circuits
- DC Grounding
- Verifying New Installations
- Power Quality Problems
- Applying Power Conditioning
- SIS Power and Grounding Installation
- Intrinsic Safety Devices

DeltaV Operator Interface for Continuous Control

Course 7012 CEUs: 1.4



This course is for operators, supervisors and managers responsible for the operation of continuous processes using DeltaV system.

Overview

This 2-day course uses lectures and hands-on workshops to provide an in-depth overview on operating the DeltaV System. Students who complete this course will:

- access operator displays
- manipulate various control module operating parameters to operate the process
- respond to process alarms
- monitor process performance
- view real-time and historical trend data

Topics

- System Overview
- Accessing DeltaV Operate Window, Menus Displays and Directories
- Discrete and Analog Control Module Operation
- Accessing Alarm Displays/Alarm Handling
- Motor Control Module Operation
- Regulatory/Cascade Control Module Operation
- Accessing Real-time/Historical Trend Data
- Unit Alarms
- Sequential Function Chart Operation
- Phase Logic Modules

Virtual Training Available, Call to Discuss.

eLearning: DeltaV Operator Interface for Continuous Control

Course e7012 CEUs: 1.2



Audience

Operators, supervisors and managers responsible for the operation of continuous processes using the DeltaV system. This is an interactive on-line course with DeltaV screens including audio presentations, demonstrations, practice sessions, workshops, quizzes and a final examination. The average time to complete the course is 12 hours.

Topics

- DeltaV System Overview
- Operating Analog Modules
- Alarms and Events
- DeltaV Trending

www.emersonprocess.com/education

Quick Links - Click to eStore: Blended Learning

Note: Course access is 3 months.

DeltaV Operator Interface for Batch

Course 7014 CEUs: 1.8



This course is for operators, supervisors, and managers responsible for the operation of batch processes using DeltaV system.

Overview

This 2-1/2 day course uses lectures and hands-on workshops to provide an in-depth overview on operating the DeltaV System. It includes all content in course 7012 plus students will:

- understand basic batch terminology
- manipulate Unit Module parameters
- access the Batch Operator Interface
- run procedures
- review batch history data

Topics

- System Overview
- Accessing DeltaV Operate
- Window, Menu Displays and Directories
- Discrete, Analog, Regulatory and Cascade Control Module Operation
- Motor Control Module Operation
- Accessing Alarm Displays/Alarm Handling
- Accessing Real-time/Historical Trend Data
- Accessing Process History View
- Sequential Function Chart Operation
- Phase and Recipe Controls
- Batch Operator Interface
- Batch Historian
- Campaign Manager

Price/Location/Start Date: Call to Discuss

Virtual Training Available, Call to Schedule.

eLearning: DeltaV Operator Interface for Batch Control

Course e7014 CEUs: 1.6



Audience

Operators, supervisors, and managers responsible for the operation of a batch process using the DeltaV system. This is an interactive 16-hour on-line course with DeltaV screens including audio presentations, demonstrations, practice sessions, workshops, quizzes and a final examination.

Topics

- System Overview
- Accessing DeltaV Operate
- Navigation in DeltaV Operate
- Discrete, Analog, Regulatory, and Cascade Control Module Operation
- Motor Control Module Operation
- Accessing Alarm Displays
- Accessing Real-Time/Historical Trend Data
- Accessing Process History View
- Phase and Recipe Controls
- Batch Operator Interface
- How to Add/Run Batches

www.emersonprocess.com/education

Quick Links - Click to eStore: Blended Learning

Note: Course access is 3 months

DeltaV Operator Training Simulation (OTS)

Overview

DeltaV Operator Training Simulation (OTS) is an engineered, hands-on, process-specific learning environment designed to up-skill our customers' operations workforce. DeltaV OTS exposes operators to what they will experience in their actual control room. This enables operations personnel to gain experience in an off-line, non-intrusive environment. Operators will learn DeltaV operating concepts while learning their actual process in preparation to effectively handle incidents or process upsets. The ability to practice how to handle potential incidents in a simulation environment is invaluable.

The OTS training solution is not only key to preparing operations personnel prior to the start-up of new automation projects. It's an ongoing tool to train future operators, a great refresher tool and a platform for more advanced training for current operators.

DeltaV OTS includes the following key deliverables:

- Self-Guided Custom Curriculum Based on the Customer's Configuration and actual displays
- DeltaV Training Simulators that include both hardware and software that operate the customer configuration in a simulated environment
- Student Testing that includes realistic failure scenarios that record actual operator responses

Key tangible savings and benefits include:

- Quicker, Smoother Start-Ups
- Reduced Operator Error
- Product Loss Reduction/Elimination
- Improved Product Quality
- Regulatory Violation Reduction/Elimination
- Reduce Incident Reporting
- Operator Acceptance and Endorsement to Change Management

To discuss OTS and simulation contact us at OTS@EmersonProcess.com



To enroll in DeltaV courses please call 800-338-8158 or 641-754-3771.
For additional contact information refer to the appropriate contact on page 109. Updated dates & locations are available on our website at www.emersonprocess.com/education.

PlantWeb/DeltaV Introduction

Course 7101 CEUs: 2.1

This course is for individuals needing an introduction to the technology and concepts used in the new generation of process control systems and safety systems.

Overview

Students who complete this 3-day course will be able to:

- use and apply PlantWeb terminology and acronyms
- understand the functions of DeltaV hardware components
- understand the capabilities of DeltaV software applications
- understand the Foundation™ fieldbus technology
- understand AMS Device Manager software
- understand the DeltaV SIS architecture.

Perform basic workstation operations including accessing displays, interpreting faceplates and accessing modules to make process changes, responding to alarms and observing/changing tunable configuration parameters.

Prerequisites

None.

Topics

- DeltaV System Description
- Analog Control Modules
- Discrete Control Modules
- FOUNDATION™ fieldbus
- AMS Device Manager
- DeltaV SIS Overview
- SIFs in DeltaV
- DeltaV SIS Operations

DeltaV Safety Instrumented System (SIS) Maintenance

Course 7303 CEUs: 2.1

This course is for individuals responsible for maintaining a DeltaV SIS.

Overview

This 3-day course is a hands-on instructor led course. The course covers the architecture of the DeltaV SIS including Rosemount SIS instruments and Fisher SIS Digital Valve Controllers. Students will gain a working knowledge of the hardware and software allowing them to troubleshoot and maintain the system.

Prerequisites

Course 7018, DeltaV Hardware and Troubleshooting, is a requirement.

Topics

- Safety Lifecycle
- DeltaV SIS Overview
- DeltaV SIS Hardware
- Safety Instrumented Functions
- Rosemount SIS Instruments
- AMS Device Manager
- Fisher SIS Digital Valve Controller
- SISNet Repeaters

DeltaV SIS Implementation

Course 7305 CEUs: 3.2



This course is for personnel who design, implement, commission and service DeltaV SIS.

Overview

This 4-1/2 day course is a hands-on instructor led course. The course covers complete DeltaV SIS Implementation including hardware and software architecture. Students will be able to design a DeltaV SIS Network and Safety Instrumented Functions (SIFs). Additionally, students will be able to configure smart SIS instruments and their associated alerts, including partial stroke testing.

Prerequisites

Course 7009 is a requirement. Recommend IEC 61511 knowledge.

Topics

- DeltaV SIS Overview
- DeltaV SIS Hardware
- Configuring SIFs in DeltaV
- Rosemount SIS Instruments
- AMS Device Manager
- Fisher SIS Digital Valve Controller
- SISNet Repeaters
- DeltaV SIS Security
- DeltaV Version Control



Introducing Emerson's Virtual Classroom – Maximizing your investment!



Connect from anywhere to Emerson's Virtual Classroom to receive live, instructor led training without the cost and inconvenience of travel.

Virtual Classroom – delivering value based instruction to your desktop via a virtual classroom with live instructor interaction with full access to DeltaV™ or Syncade™ systems. Save time and travel related expenses. Achieve your training goals by utilizing Emerson's Virtual Classroom.

Introduction

Emerson's Virtual Classroom delivers traditional courseware from certified instructors with access to fully functional systems via the internet. Now you can garner the benefits of Emerson's training without leaving your office or home!

Emerson uses Adobe® and GoToMyPC® technology to provide a rich training environment that is easy to use. Emerson's certified Instructors deliver the curriculum through the Adobe Connect meeting room with full audio and video support. You can pose questions directly to the instructor or share them with the entire classroom.

Emerson facilitates your hands-on, learn by doing experience by connecting students directly to a system located in a factory classroom using the GoToMyPC technology. Utilize Emerson's virtual classroom capability to achieve outstanding results without the costs typically associated with factory based training.

Benefits

Convenient: Accomplish your training from work, home or anywhere with an internet connection. With Emerson's Virtual Classroom you have access to your systems, instructors and curriculum from anywhere in the world. Imagine taking a class from the comfort of your home without the lost time and hassles of travel, airports and hotels.

Savings: Today everyone is looking for best cost options without sacrificing quality. Emerson provides the same curriculum from the same professional staff on the same systems you would use if you were taking the class at the factory school.

Quality Instruction: Emerson's Factory certified instructors lead every class using the same learn by doing methodologies. Because each student has access to a system, they can participate in workshops, explore and experiment. Students can also think longer about what they want to say and add their comments when ready.

Content Flexibility: Because the classes originate from the factory, you have greater flexibility in defining special or custom content to suit your training needs. Emerson's Virtual Classroom facilitates multiple subject matter expert availability from one location.

The Following Classes are Available for Virtual Classroom. Call to Discuss Options for Additional Offerings or On-Site Training.

- 7009 - DeltaV Implementation I
- 7012 - DeltaV Operate Continuous
- 7014 - DeltaV Operate Batch
- 7016 - DeltaV Batch Implementation
- 7017 - DeltaV Implementation II
- 7025 - DeltaV Advanced Graphics
- 7201 - DeltaV Advanced Control
- 7202 - DeltaV Model Predictive Control
- 7305 - DeltaV SIS Implementation
- 7080 - Syncade Suite Overview
- 7081 - Syncade Suite Document Control and Archiving
- 7082 - Syncade Suite Training and Development
- 7083 - Syncade Suite Equipment Tracking
- 7084 - Syncade Suite Materials, Inventory and Order Management
- 7095 - Syncade Suite Recipe Authoring 4.0

www.emersonprocess.com/education <Select > Virtual Learning - 800-338-8158 - education@emerson.com



Ovation® The complete training schedule and other training information can be accessed at www.ovationusers.com. The website also provides important customer information such as downloadable Ovation manuals, Product Notification and Security Patches, Software Release information, and more. To register for web access, go to www.OvationUsers.com, click on the Apply for Web Access link, and enter Code TNG11. Once we verify your status as an owner or end-user, your ID and password will be sent to you via email.

Ovation Course Descriptions

www.OvationUsers.com
Contact Information: 412-963-3900

OV010-WIN — Ovation Operator

Provides the user with the ability to use the Ovation system to perform trends, understand alarming, point (tag) details and searches as well process graphics. Concise overview of the controller, network and workstations are presented. *Offered Upon Request

OV100-WIN — Starting with Data Acquisition

Reviews the major components in an Ovation System (controllers, network switches, Operator Station and Engineer Station). The student is taught how to use Ovation tools to configure I/O modules and to modify and create digital and analog point records.

OV200-WIN — Building & Maintaining Ovation Control

Provides proficiency in reading Ovation functional control schemes, tuning controls schemes to improve performance, and building/implementing new control schemes. Discusses creating effective control using algorithms. Required Prerequisite: OV100

OV210-WIN — Building Ovation Graphics

Covers building Ovation system graphic diagrams and using the Ovation Graphics Builder. Course topics include layout and implementation of static and dynamic objects, linking to control, and creating perspective-type diagrams. Required Prerequisites: OV100, OV200

OV215-WIN — Ovation Software Project

Contains and connects software topic segments from five different Ovation one-week courses: OV100, OV200, OV210, OV230 and OV300. The topics covered include Ovation application functions, Developer Studio Architecture, point building, creating and modifying control sheets, creating and modifying graphics, backing-up MMI(s) including a Domain Controller, and adding points for collection to an Ovation Process Historian. The course is not intended to replace the five one-week courses directed toward personnel who have the singular need for the detailed knowledge provided in the one-week courses.

OV216-WIN — Ovation Hardware Project

The course is designed for personnel whose primary interest and/or job assignment is maintaining the Ovation Hardware. Selected topics from several courses are incorporated and expanded upon to cover hardware features of the Ovation controller, its power supplies and the most commonly applied I/O modules (including HART). Hands-on exercises will require building control sheets and linking inputs and outputs to selected modules. Required Prerequisites: OV100, OV200 or OV215

OV217-UNIX — Ovation UNIX Core Training

This course incorporates topics from four different subjects: database, control, graphics and troubleshooting. This course reviews the major components in the Ovation system (controllers, network switches, Operator Station and Engineer Station), how to use the Ovation tools to modify and create digital and analog point records, build and modify control schemes and graphics and will briefly review troubleshooting.

OV230-WIN — System Administration

Addresses configuring the system and maintaining the integrity of Ovation system software. Presents operating system commands and programs that facilitate system administration. Describes the components of the network. *OV230-UNIX Offered Upon Request

OV235-WIN — Ovation SIS Implementation

Teaches students to recognize the terminology used with Ovation SIS. Describes the functions of the Ovation SIS network and its components. Describes the general architecture of Ovation SIS. Students will be able to monitor Ovation SIS using the data acquisition tools and configure an Ovation SIS network and SIS Controller. *Offered Upon Request

OV245-WIN — Ovation Process Historian

Provides knowledge to setup and configure the Ovation Process Historian to retrieve real-time and historical data. Students will create, schedule, and generate various types of reports, including periodic, event-driven, and on-demand. The course includes basic troubleshooting skills to help students analyze and resolve problem conditions. Required Prerequisite: OV100

OV246-WIN — Ovation OPH Report Building

This course will teach students to configure and retrieve historical data using the Ovation Process Historian (OPH) and Crystal Reports. Students will learn how to use the OPH Report Manager to define alarm, SOE, point and operator event reports. Students will also learn how to configure demanded reports, triggered reports, and timed reports in the OPH Report Manager. Students will also use Crystal Reports to create new report formats for use in the OPH Report Manager. Required Prerequisite: OV100 *Offered as a Virtual Course. See page 11

Ovation® The complete training schedule and other training information can be accessed at www.ovationusers.com. The website also provides important customer information such as downloadable Ovation manuals, Product Notification and Security Patches, Software Release information, and more. To register for web access, go to www.OvationUsers.com, click on the Apply for Web Access link, and enter Code TNG11. Once we verify your status as an owner or end-user, your ID and password will be sent to you via email.

Ovation Course Descriptions

www.OvationUsers.com
Contact Information: 412-963-3900

OV265-WIN — Ovation Expert Transition

This course will provide the user with proficiency in updating the Ovation interface after a change has been made to the ABB Bailey Infi 90. Students will learn the basic mechanics of using the Ovation OPC client and OPC90 Server (Rovisys) applications. The course includes layout and implementation of the hardware and software required for the migration. Simple methods for troubleshooting faults will also be discussed. Recommended Prerequisite: OV100

OV270-WIN — Ovation with HART and Smart Devices

Provides the skills to fully utilize the special features of I/O related to HART and smart field devices attached to their Ovation system. Items discussed include physical attachment of field devices to I/O modules, building of data points, analysis of data, and diagnosis of potential problems.

Required Prerequisite: OV100 *Offered as a Virtual Course. See page 11

OV275-WIN — AMS Suite: Intelligent Device Manager

This course provides thorough information on how to configure and use AMS Intelligent Device Manager with your Ovation DCS. Students will receive hands-on experience using Ovation and AMS Device Manager software to configure Smart devices on your Ovation network. Students will also configure and examine Ovation PlantWeb Alerts generated from the Smart devices. The course is intended for plant personnel who will configure, troubleshoot, and administer AMS Device Manager on an Ovation Network. Required Prerequisite: OV100 Recommended Prerequisite: OV270 *Offered as a Virtual Course. See page 11

OV280-WIN — Ovation SCADA System

Teaches the basic components of an Ovation SCADA system. Items covered include SCADA servers, remote terminal units, scan blocks, lines, ports, configuration, protocol analyzers, and more. Recommended Prerequisites: OV100, OV210 *Offered as a Virtual Course. See page 11

OV295-WIN— Ovation Third-Party I/O Interfaces

The course teaches students how to create specialized I/O links to non-Ovation field devices using both serial link modules and the Ovation Ethernet highway. The course covers configuring and loading link controller modules, creating third-party points, memory mapping, ELC, adding third party drivers to controllers and the Ovation IP addressing requirements. Required Prerequisite: OV100 Recommended Prerequisite: OV200 *OV295-UNX Offered Upon Request

OV300-WIN — Ovation Troubleshooting

Provides the skills and methods to troubleshoot and repair faults in the data acquisition and control functions of the Ovation system. Requires students to isolate faults anywhere in the signal path, from the field terminations to the I/O modules, through the controller, across the network and into the graphic display. Students will evaluate single- and multiple-problem scenarios. Required Prerequisites: OV100, OV200, OV210 or OV215, OV216

OV310-WIN — Advanced Ovation Graphics

Uses application programs and advanced programming techniques, including the use of memory segments combined with pointer manipulation, to enhance advanced graphic programming skills. Builds several graphics utilizing pointers and memory segments. Teaches students to assess problematic graphics and solve them with available tools. Required Prerequisite: OV210 *OV310-UNX Offered Upon Request

OV315 — SmartProcess™ Global Performance Advisor

The course describes the capabilities and limitations of a GPA, the hardware and software requirements to implement it, and provides hands-on exercises to install, use and backup the GPA and the information that is created. After the attendees have loaded the GPA on a workstation and have been provided the knowledge of how to create a workspace, a project and a functional block diagram, hands-on exercises will include building feed-water heater performance calculations, building steam turbine performance calculations, and building condenser calculations. Data agents, and communication on a local and enterprise systems, are described. Recommended Prerequisite: OV200 *Offered Upon Request

OV320-WIN — Ovation Network Administration

Provides an understanding of general networking concepts, as well as Ovation-specific network configurations for Fast Ethernet systems. Teaches hands-on knowledge of switch and router configuration for use in Ovation systems. Course intended for Ovation network administrators, system administrators, and those upgrading their Ovation Certification Program. *OV320-UNX Offered Upon Request

OV330-WIN/UNIX — Advanced Control Techniques

Builds off of previous control-building knowledge to teach implementation of control design. Continues topics from OV200-UNX/OV200-WIN.

Required Prerequisite: OV200 *Offered as a Virtual Course. See page 11

OV340-WIN — Ovation Applications with Fieldbus

This course will provide students with a thorough knowledge of Fieldbus applications as applied to an Ovation System. Ovation Fieldbus module, segment design, device commissioning, Ff algorithms, and basic troubleshooting are covered. Students will be provided with hands on experience implementing Fieldbus architecture. This course is intended for technicians who install and maintain Ovation Fieldbus devices. Required Prerequisite: OV100, OV200

Recommended Prerequisite: OV275



Ovation® The complete training schedule and other training information can be accessed at www.ovationusers.com. The website also provides important customer information such as downloadable Ovation manuals, Product Notification and Security Patches, Software Release information, and more. To register for web access, go to www.OvationUsers.com, click on the Apply for Web Access link, and enter Code TNG11. Once we verify your status as an owner or end-user, your ID and password will be sent to you via email.

Ovation Course Descriptions

www.OvationUsers.com

Contact Information: 412-963-3900

OV350-WIN — Ovation Applications with Profibus

This course will provide students with a thorough knowledge of Profibus applications as applied to an Ovation System. Ovation Profibus Module, segment design, device commissioning, point mapping and basic troubleshooting are covered. Students will be provided with hands-on experience implementing Profibus architecture. This course is intended for technicians who install and maintain Ovation Profibus devices. Required Prerequisite: OV100

OV355-WIN — Ovation Applications with Wireless

This course reviews the major components in an Ovation wireless system (wireless transmitters, gateways, and the components of the SmartPack™). The student is taught how to utilize the available configuration tools to set up an Ovation wireless interface and add transmitters to an existing network. Required Prerequisite: OV100

OV360-WIN — Ovation Security for 2.4 & Higher Level Systems

Guides students in the proper planning and installation of security for Ovation systems version 2.4 and later. Students will discuss and understand Ovation external and internal security concerns and apply appropriate safeguards. Covers installation and configuration of Ovation-compatible Windows Server 2003 Domain Controllers, Windows XP service packs, and Windows security patches. Student will configure Ovation security using Ovation Security Manager.

OV365-WIN/UNIX — Ovation Security Center

The Ovation Security Center (OSC) consists of a suite of security packages and services that have the ability to enhance and manage the cyber security of Ovation expert control systems without disrupting the controlled process. The OSC is a key component in achieving NERC CIP compliance by offering services such as: Patch Management, Event Management and Malware Prevention. The course will examine how to configure and maintain the components of an OSC system on Ovation levels 2.4 and newer on Windows OS and Ovation levels 1.7 and newer on Solaris OS. Recommended Prerequisite: OV320, OV360

OV370-WIN/UNIX — Ovation Turbine Control System

Examines the Ovation steam turbine control system functions, including operation, graphics, and control logic, using tie-back simulators. Includes calibration and troubleshooting exercises on speed detector and valve positioner modules. Required Prerequisite: OV100, OV200 Recommended Prerequisite: OV375

OV375-WIN/UNIX — Steam Turbine Mechanic Hydraulics

This course is designed to identify the major hydraulic components, pumps, accumulators and other electro-hydraulic control elements of a steam turbine. Students will demonstrate knowledge on hydraulic logic valves, as related to directional, proportional and servo valves and trace components using hydraulic diagrams and drawings. Students will also demonstrate knowledge on types of oil used, acceptable temperatures, cleanliness and how to fill the tank.

OV380-WIN/UNIX — Ovation Boiler Control

Reviews standard control logic used in Ovation systems for a typical, coal-fired, drum-type boiler. Examines typical analog and digital logic building blocks and how they combine to create a functional unit. Explores theory concerning the air, water, steam, and fuel systems, as well as the modes and operation of coordinated control. Required Prerequisite: OV100, OV200

OV400-WIN — Ovation (Base) Certification

Offered as a stand-alone web-based exam or implemented with a pre-testing review at the Training Center, the OV400-WIN measures the student's proficiency in areas related to database building, control implementation, control graphic linkage and troubleshooting on a system-wide basis. Earning Ovation certification acknowledges the competency of the individual on Ovation product lines and enhances their abilities in addressing, assessing and repairing problematic situations within the Ovation system. In both offerings, a multi-point examination is administered and participants are required to achieve a grade score of 80% or greater to successfully gain certification. Required Prerequisite: OV100, OV200, OV210, OV300 *Contact the Training Registrar for additional information*

OV420-WIN — Ovation (Admin) Certification

Offered as a stand-alone web-based exam or implemented with a pre-testing review at the Training Center, the OV420-WIN measures the student's proficiency in areas that address the overall Ovation system configuration while maintaining the integrity of the system software. It assesses the students understanding of networking concepts and that of switch and router configurations. Achieving Admin certification acknowledges the competency of the individual in maintaining the integrity of the Ovation system concerning user access and capabilities. In both offerings, a multi-point examination is administered and participants are required to achieve a grade score of 80% or greater to successfully gain certification. Required Prerequisite: Ovation (Base) Certification Achievement and OV230, OV320, OV245 *Contact the Training Registrar for additional information*

NEW! OV430-WIN — Ovation (Security) Certification

This certification course measures the student's proficiency in applying security packages as well as managing, enhancing, and updating the cyber security of the Ovation Control System. Achieving the Security Certification acknowledges the competency of the individual who has demonstrated an understanding and ability in maintaining services such as Patch Management and Malware Prevention. A multi-point examination is administered and participants are required to achieve a score of 80% or greater to successfully gain certification. Required Prerequisite: OV360, OV365 *Contact the Training Registrar for additional information*

LEARNING PATH

To enroll in PROVOX courses or for more information, please call:
800-338-8158 or 641-754-3771

PROVOX Configuration Engineer Courses with Continuous Processes
Configuration Platform / Operator Interface Platform:

ENVOX / PROVUE:	Courses 5160; 5360
ENVOX / Operator Workplace (OWP):	Courses 5170; 5370
ENVOX / DeltaV Operate:	Courses 5190; 5390
Control Desktop / Operator Workplace (OWP):	Courses 5171; 5371
Control Desktop / DeltaV Operate:	Courses 5197; 5397

PROVOX Configuration Engineer Courses with Batch Processes
Configuration Platform / Operator Interface Platform:

ENVOX / PROVUE:	Courses 5160; 5360; 5290
ENVOX / Operator Workplace (OWP):	Courses 5170; 5370; 5290
ENVOX / PROVOX Operator Console (POC):	Courses 5190; 5390; 5290
Control Desktop / Operator Workplace (OWP):	Courses 5171; 5371; 5290
Control Desktop / DeltaV Operate:	Courses 5197; 5397; 5290

PROVOX Operations
Operator Interface Platform / Processes:

PROVUE / Continuous:	Operator Training: Course 5180;
PROVUE / Batch:	Training-the-Trainer: Course 5182
Operator Workplace (OWP) / Continuous:	Operator Training: Course 5280;
Operator Workplace (OWP) / Batch:	Training-the-Trainer: Course 5282
PROVOX Operator Console (POC) / Continuous:	Operator Training: Course 5181;
PROVOX Operator Console (POC) / Batch:	Training-the-Trainer: Course 5183
	Operator Training: Course 5281;
	Training-the-Trainer: Course 5283
	Course 5184
	Course 5284

PROVOX Installation, Hardware & Troubleshooting Course
PROVOX Operation Console
with the SRx Controller:

Course 5503

DeltaV™ Operate for PROVOX:
System Administration

Course 7060 (see page 79)

To enroll in PROVOX courses please call 800-338-8158 or 641-754-3771.
For additional contact information refer to the appropriate contact on page 109. Updated dates & locations are available on our website at www.emersonprocess.com/education.

PROVOX® Many training courses are available for individuals serving the worldwide installed base of the well-established PROVOX distributed control system. As the technology is continually evolving, PROVOX training is updated accordingly and should be considered by anyone responsible for configuring, operating, and troubleshooting this system.

PROVOX System Configuration Using Control Desktop and DeltaV Operate

Course 5197 CEUs: 3.2

This course is designed for process control engineers, senior maintenance technicians, and supervisory personnel responsible for using ENVOX P5.0 Control Desktop software to configure a DeltaV Operate for PROVOX Console and either a SR90 or SRX Controller. This course is the prerequisite for the Advanced Continuous and Batch Schools.

Overview

This 4-1/2 day course teaches configuration of a SR90/SRX controller and DeltaV Operate for PROVOX Console. Students will configure the controller to do automatic control of a simulated process and a PROVOX Operator console to be used as an operator interface. Students who complete this course will be able to:

- complete the basic configuration for an SR90/SRX controller, to include basic device and database definition, I/O definition and data acquisition points
- use Control Desktop to configure the DeltaV Operate for PROVOX Console device definition and point alarm handling
- use DeltaV Run and the DeltaV Configure mode to create and test basic operator displays
- use Control Desktop software to create, copy and modify PROVOX database elements
- generate and download a basic DeltaV Operate for PROVOX Console Configuration containing PPA's, PMA's, and basic displays

Topics

- DeltaV Operate for PROVOX Console Configuration
- Control Desktop Configuration Software with ENVOX
- PROVOX Basic Point Configuration

Advanced PROVOX System Configuration Using Control Desktop and DeltaV Operate

Course 5397 CEUs: 3.2

This course is for configuration personnel responsible for configuration of the advanced function of the SR90/SRX controller and the DeltaV Operate for PROVOX operator interface using ENVOX P5.0/Control Desktop.

Overview

This 4-1/2 day course teaches students advanced configuration of the DeltaV Operate for PROVOX and the SR90/SRX Controller. At the completion of this course, the student will be able to:

- create and modify Loops, Cascade pairs, Advanced DCD's and Group points
- create Function Sequence Tables (FST's) and Logic Control Points
- utilize Trace Tune Utility Program to troubleshoot FST Programs
- use DeltaV Configure and run modes to create and test more advanced operator displays

Prerequisites

Any of the 51XX series of courses will serve as a prerequisites.

Topics

- Advanced Point Configuration
- Logic Control Points
- Loop Points
- Enhanced DCD's
- DeltaV Configure
- Advanced Scripting and Dynamo Creation

Introduction to PROVOX System Configuration Using ENVOX on a DEC-Based Platform

Course 5160 CEUs: 3.2

This course is for process control engineers, senior maintenance technicians, and supervisory personnel responsible for specifying and configuring a PROVOX system using ENVOX on a DEC-Based Platform. This course will include the basic configuration for the PROVUE console and an SR90/SRX controller.

Overview

This 4-1/2 day course teaches the base configuration of a PROVOX console and controller using ENVOX configuration software. A controller containing Data Acquisition Points, DCD's and loop points will be created. The student will also configure a functional PROVUE Console including displays, PMA's, and PPA's, using ENVOX configuration software. Students who complete this course will be able to:

- perform PROVUE Console operations
- use the ENVOX software to create, modify, and document the PROVOX database elements
- create, generate and download an IFC/UOC, SR90/SRX
- create, modify, and delete Data Acquisition, DCD and Loop Points
- create, generate and download a basic PROVUE Console configuration containing PPA's and PMA's, and basic displays

Topics

- PROVUE Console Configuration
- Envox Configuration Software
- Provox Basic Point Configuration



PROVOX Continuous Control Configuration Using ENVOX

Course 5360 CEUs: 3.2

This course is designed for process control engineers, maintenance engineers, and operations personnel responsible for the configuration of a PROVUE Operations Console, SR90/SRX Controller, using ENVOX on a DEC-Based Platform.

Overview

This 4-1/2 day course teaches students advanced configuration of the PROVUE Operations Console and the controller used for continuous process control. At the completion of this course, students will be able to:

- perform advanced PROVUE Console point operations with multiple PPAs, PMAs, and alarm priorities
- create and modify a Cascade Loop, advanced DCDs, and Group Point
- create Function Sequence Tables (FSTs) and Logic Control Points (LCPs)
- create and download an advanced PROVUE Console configuration
- utilize Trace/Tune software to troubleshoot FST programs
- use the display editor to create basic and advanced displays
- create Console Reports

Prerequisites

Course 5160, Intro. to PROVOX System Config. Using ENVOX on a DEC Platform

Topics

- Advanced Point Configuration
- Logic Control Points
- Cascade Loop Control
- Advanced Display Creation

Introduction to PROVOX System Configuration Using ENVOX and Operator Workplace

Course 5170 CEUs: 3.2

This course is designed for process control engineers, senior maintenance technicians, and supervisory personnel responsible for specifying and configuring an OWP based PROVOX DCS Operations Console and controller. This course will include the basic configuration for the operator workplace console (OWP) and an SR90/SRX controller using ENVOX on a DEC-Based Platform.

Overview

This 4-1/2 day course teaches the base configuration of an OWP and controller using ENVOX configuration software. A controller containing Data Acquisition Points, DCD's and loop points will be created. The student will also configure a functional Operator Workplace Console including displays, PMA's, and PPA's using ENVOX configuration software. Students who complete this course will be able to:

- perform OWP console operations
- use the ENVOX software to create, modify, and document the PROVOX database elements
- create, generate and download an IFC/UOC controller
- create, modify, and delete Data Acquisition, DCD and Loop Points
- create, generate and download a basic OWP configuration containing PPA's, PMA's and basic displays

Topics

- OWP Console Configuration
- ENVOX Configuration Software
- PROVOX Basic Point Configuration

PROVOX Continuous Control Configuration Using ENVOX and Operator Workplace

Course 5370 CEUs: 3.2

This course is designed for process control and maintenance engineers, and operations personnel responsible for the configuration of an Operator Workplace Console and IFC/UOC SR90/SRX Controller using ENVOX on a DEC-Based Platform.

Overview

This 4-1/2 day course teaches students advanced configuration of the OWP Console and the controller used for continuous process control. At the completion of this course, students will be able to:

- perform advanced OWP Console point operations
- create and modify Cascade Loops, advanced DCDs, and Group Points
- create Function Sequence Tables (FSTs) and Logic Control Points (LCPs)
- create and download an advanced OWP Console configuration
- utilize Trace/Tune software to troubleshoot FST programs
- use the display editor to create basic and advanced displays
- create Console Reports

Prerequisites

Course 5170, Intro. to PROVOX System Configuration Using ENVOX and Operator Workforce

Topics

- Advanced Point Configuration
- Logic Control Points
- Cascade Loop Control
- Enhanced DCDs
- Intelligent Device Interface (Optional)
- Advanced Display Creation



To enroll in PROVOX courses please call 800-338-8158 or 641-754-3771. For additional contact information refer to the appropriate contact on page 109. Updated dates & locations are available on our website at www.emersonprocess.com/education.

PROVOX System Configuration Using ENVOX and PROVOX Operator Console

Course 5190 CEUs: 3.2

This course is designed for process control engineers, senior maintenance technicians, and supervisory personnel responsible for using ENVOX on a DEC Based Platform to configure PROVOX Operator Console and either a SR90 or SRX Controller. This course is the prerequisite for the Advanced Continuous and Batch Schools.

Overview

This 4-1/2 day course teaches configuration of a SR90/SRX controller and PROVOX Operator Console. Students will configure the controller to do automatic control of a simulated process and a PROVOX Operator console to be used as an operator interface. Students who complete this course will be able to:

- complete the basic configuration for an SR90/SRX controller, to include basic device and database definition, I/O definition and data acquisition points
- use ENVOX to configure the PROVOX Operator Console device definition and point alarm handling
- use the Graphics Studio to create basic and some advanced operator displays
- use ENVOX software to create, copy and modify PROVOX database elements
- generate and download a basic PROVOX Operator Console Configuration containing PPA's, PMA's, and basic displays

Topics

- PROVOX Operator Console Configuration
- ENVOX Configuration Software
- PROVOX Basic Point Configuration
- Graphics Studio

PROVOX Advanced Continuous Control Configuration Using ENVOX and PROVOX Operator Console

Course 5390 CEUs: 3.2

This course is designed for configuration personnel who are responsible for configuration of the advanced function of the SR90/SRX controller and the PROVOX Operator Console operator interface using ENVOX on a DEC-Based Platform.

Overview

This 4-1/2 day course teaches students advanced configuration of the PROVOX Operator Console/SR90/SRX Controller. Students will:

- create/modify Loops/Cascade pairs/Adv. DCD's and Group points
- Function Sequence Tables/Logic Control Points
- Trace Tune Utility Program-troubleshoot FST
- use the Fix Graphics- create advanced Operator Displays

Prerequisites

Course 5190, PROVOX System Configuration Using ENVOX and PROVOX Operator Console

Topics

- Advanced Point Configuration
- Logic Control Points
- Loop Points
- Enhanced DCD's
- Graphics Studio Scripting
- Dynamos for Graphics Studio

PROVOX Batch Control Configuration Using ENVOX for PROVUE, DeltaV Operator for PROVOX Console and/or Operator Workplace Console

Course 5290 CEUs: 3.2

This course is designed for process control and maintenance engineers, and operations personnel responsible for the configuration of a fully functional Unit Operations Controller and operator interface.

Overview

This 4-1/2 day course will concentrate on the batch functionality for the SR90/SRX controller. The console resident activity point will also be covered. At the completion of this course the student will be able to:

- configure Operations and Unit Points to control a batch process
- create Procedures, Point Sets and Console Activity Points
- create console Batch End Reports
- perform advanced scripting for the PROVOX Operator Console

Prerequisites

Courses 5360, or 5370, or 5390

Topics

- Unit and Operation Configuration
- Multiple Units and Operations
- Activity and Procedure Configuration
- Point Sets and Acquire Sets for Parallel Processes
- Batch End Reporting

PROVOX Systems Hardware and Troubleshooting

Course 5503 CEUs: 5.3

This course is for those responsible for the hardware/troubleshooting of PROVOX system.

Overview

This 7-1/2 day hands-on course covers hardware/troubleshooting of the data highway, console, and SRx, Controller with serial I/O using ENVOX diagnostic tools.

Topics

- Hardware/Troubleshooting of:
 - PROVOX Data Hwy II;
 - Control (serial) I/O Hardware; - Intelligent Device Interface (IDI).; - SRx Controllers;
 - PROVOX Operations (POC) Console;
 - DC Power System; ENVOX Diagnostics; Downloading/Databases; Communications (PROVOX & Ethernet)

Mastering PROVOX FSTs

Course 5375 CEUs: 3.2

This course is designed for process control engineers and technicians responsible for configuring and maintaining IFC/UOC, SR90 Controller (Function Sequence Table) control language.

Overview

This 4-1/2 day course uses lectures and hands-on activities to teach students the strength and versatility of the FST control language. The course stresses learning the programming fundamentals and using them to solve control problems. Students use a software emulation package as a learning tool and as an FST development tool. Students who complete this course will be able to:

- demonstrate increased productivity and optimum creativity in writing effective FST programs
- maintain FSTs in an existing system without disturbing the on-line system
- develop FSTs from logic diagrams of the control system
- test their own control solution techniques before establishing them

Prerequisites

Students should have experience configuring PROVOX IFC or UOC devices and have completed at least one of the following courses: 5200, 5260, 5270, 5300, 5360 or 5370

NOTE: The software simulation program used in the course FSTeacher is available as an optional add-on to the course fee. For more information, call 800-338-8158 or 641-754-3771.

PROVOX System Configuration Using Control Desktop 1.0/OWP

Course 5171 CEUs: 3.2

Overview

This 4-1/2 day course teaches configuration of the controller and OWP Console subsystems of a PROVOX DCS System. Students will configure a controller containing Data Acquisition Points, Loops, and DCD's; and an Operator Workplace Console. Students completing this course will be able to:

- monitor a basic process from an OWP console
- use Control Desktop with ENVOX software to create/copy & modify PROVOX database elements
- create an OWP console configuration, including PPA's and PMA's.
- generate and download the console and controller from the Control Desktop PC

PROVOX Continuous Control Configuration Using Control Desktop OWP

Course 5371 CEUs: 3.2

This 4-1/2 day course teaches students adv. configuration of the OWP Console and the IFC device used continuous process control.

- create/modify Cascade Loops, and Group Points using Control Desktop software
- ENVOX software- create Enhanced DCD's
- create Logic Control Points (LCP's) and their Function Sequence Tables (FST's) using CD software with ENVOX
- create/download adv. OWP configuration
- troubleshoot FST programs with Trace/Tune
- create adv. displays- ENVOX display editor
- create Console Reports



To enroll in PROVOX courses please call 800-338-8158 or 641-754-3771. For additional contact information refer to the appropriate contact on page 109. Updated dates & locations are available on our website at www.emersonprocess.com/education.

5180 Operator Training - Train the Trainer

Course 5182 CEUs: 1.8

Overview

This 2-1/2 day course is offered in Austin, Texas to train instructors to teach operator training course 5180.

5181 Operator Training - Train the Trainer

Course 5183 CEUs: 1.8

Overview

This 2-1/2 day course is offered in Austin, Texas to train instructors to teach operator training course 5181.

Operator Training: PROVUE Console-Based System Operator for Continuous Processes

Course 5180 CEUs: 1.4

Overview

This 2-day course uses lectures and hands-on workshops to provide an in-depth overview of the PROVUE Console in continuous process operations.

Operator Training: PROVUE Console-Based System Operation for Batch Processes

Course 5280 CEUs: 2.1

Overview

This 3-day course uses lectures and hands-on workshops to provide an in-depth overview of the PROVUE Console in batch process operations.

Operator Training: Operator Workplace Console Oper. for Continuous Processes

Course 5181 CEUs: 1.8

Overview

This 2-1/2 day course uses lectures and hands-on workshops to provide an in-depth overview of the OPERATOR WORKPLACE Console.

Operator Training: Operator Workplace Operations for Batch Processes

Course 5281 CEUs: 2.1

Overview

This 3-day course uses lectures and hands-on workshops to provide an in-depth overview of the Operator Workplace Console.

5280 Operator Training - Train the Trainer

Course 5282 CEUs: 2.1

Overview

This 3-day course is offered in Austin, Texas to train instructors to teach operator training course 5280.

5281 Operator Training - Train the Trainer

Course 5283 CEUs: 2.1

Overview

This 3-day course is offered in Austin, Texas to train instructors to teach operator training course 5281.

PROVOX Operator Console for Continuous Processes

Course 5184 CEUs: 1.8

Overview

This 2-1/2 day course uses lectures and hands-on workshops to provide an in-depth overview of the PROVOX OPERATOR CONSOLE.

PROVOX Operator Console for Batch Process

Course 5284 CEUs: 2.1

This 3-day course uses lectures and hands-on workshops to provide an in-depth overview of the PROVOX OPERATOR CONSOLE.

These courses are available on request for customers having a minimum number of participants (normally at least 4).

To arrange training please call 1-800-338-8158 (within the U.S.) or 641-754-3771

RS3™ RS3 distributed control system training is formatted for individuals to progress at their own pace. Courses are designed to give engineers, operators, and/or technicians the information they will need to configure, operate, and troubleshoot RS3 systems in continuous or batch operations.



Introduction to RS3

Curriculum 3100 CEUs: 3.5

Overview This curriculum provides a starting point for all engineers, technicians and other personnel who will configure, install, or maintain any part of a RS3 Distributed Control System. It may meet all the needs of those configuring control systems for continuous processes requiring nothing more complex than cascade or ratio control, simple interlocks or motor controls. For others, 3100 modules serve as prerequisites for modules in the 3200, 3500 or 3600 curricula. This curriculum can provide a basic understanding of RS3 for managers and others whose success depends on the system but who will not work with it directly.

Modules

- 3100-1 Developing Basic Operating Skills Using the RS3 MTCC Console
- 3100-2 System Hardware and Architecture
- 3100-3 Configuring Basic Control Loops
- 3100-4 Configuring Trends, Reports, Alarms/ Console Configuration- RS3 MTCC Console
- 3100-5 Configuring Logic Functions/Displays Using the RS3 MTCC Console
- 3100-6 Configuring Process Graphic Displays Using the RS3 MTCC Console
- 3100-7 Configuring Cascade/Ratio Loops

Time Required 1 week

RS3 Hardware and Maintenance

Curriculum 3200 CEUs: 3.5

Overview The 3200 curriculum is designed for technicians and engineers who are responsible for installing, starting up, or maintaining a RS3 installation. Students entering this curriculum should have a general electronics background, and should know how to use electronics test equipment such as a multimeter & current source.

Prerequisites 3100: modules 1, 2, 3 & 4

Modules

- 3200-10 RS3 Hardware Overview
- 3200-20 Power Supplies/Power Distribution
- 3200-70 The PeerWay
- 3200-30 Console Electronics
- 3200-31 CRT Displays
- 3200-32 Multitube Command Consoles
- 3200-40 Control Files -Coordinator Processor IV
- 3200-53 Overview of the I/O Subsystem
- 3200-50 Analog I/O Hardware
- 3200-51 Discrete I/O Hardware
- 3200-52 Contact I/O Hardware
- 3200-54 Low-Level Input Multiplexer
- 3200-56 PLC Interface
- 3200-57 Multipoint Analog Input/Output

Time Required 1 week

RS3 Process Operation

Curriculum 3400

Overview

The 3400 curriculum is designed for plant operators and supervisors who are responsible for day-to-day process operation. Training can be tailored to either a continuous or a batch process. The 3400 modules help the student learn how to analyze process conditions and make process adjustments, with confidence and without hesitation. Training activities help the student develop keyboard dexterity through repetition of routine procedures under increasingly challenging conditions. Qualification exercises require each student to demonstrate an adequate skill level before proceeding to the next training activity or module.

Modules

For MTCC Consoles:

- 3400-1 Basic Operating Displays and Adjustments Using the MTCC Console
- 3400-2 Operating Cascade and Ratio Loops Using the MTCC Console
- 3400-4 Operating Batch Processes Using ABC Batch Software through the MTCC Console (Batch Only!)

For ROS Consoles:

- 3400-11 Basic Operating Displays and Adjustments Using the RS3 Operator Station
- 3400-12 Operating Cascade and Ratio Loops Using the RS3 Operator Station
- 3400-14 Operating Batch Processes Using ABC Batch Software Through the RS3 Operator Station (Batch Only!)

Time Required

Standard Operator Training (non-batch) - 12 hours. Including batch - 20 hours.

To enroll in RS3 courses please call 800-338-8158 or 641-754-3771. For additional contact information refer to the appropriate contact on page 109. Updated dates & locations are available on our website at www.emersonprocess.com/education.

RS3 Advanced Configuration**Curriculum 3500 CEUs: 2.1****Overview**

Advanced Control Block configuration training for those whose needs go beyond cascade or ratio control and straightforward Interlock logic.

Prerequisite

Curriculum 3100 Introduction to RS3

Modules

- 3500-1 Introduction and Overview
- 3500-2 Configuring Control Blocks for High Level Orchestration
- 3500-3 Optimizing Complex Logic Functions
- 3500-4 Optimizing Block Data Transfer

Time Required

3 Days

Configuring RS3 Control for Batch Processes**Curriculum 3600 CEUs: 3.5****Overview**

The 3600 modules are designed for engineers who must configure/support a batch process control system using RS3 ABC Batch software.

Prerequisite

Curriculum 3100, Introduction to RS3

Modules

- 3600-10 Introduction to ABC Batch Recipe
- 3600-11 Intro. to RBL Language/Scripts
- 3600-12 Configuring Batch Tasks
- 3600-2 Displays, Alarms, & Reports
- 3600-3 Exception Management in a Task Environment
- 3600-4 Batch Data Transfer
- 3600-5 Advanced Task Organization

Time Required

1 Week



Terminal Automation

Emerson's expertise in terminal automation enables us to provide fully engineered comprehensive training.

Terminal Management System Training Using DeltaV™ for Preset Batch Control and Load Rack Monitoring

Course TA100

Overview

This course provides training to install, configure and perform day-to-day operations for Terminal Management System Revision 8. The training also provides an introduction to Load Rack hardware and teaches the basics of troubleshooting communication problems to its peripheral devices. This course is targeted for terminals using DeltaV controller for preset batch control. This course will not cover DeltaV configuration.

Prerequisite

There are no prerequisites for this course, however prior terminal operation knowledge would be useful.

Topics

- Introduction to Load Rack Hardware Readers and Communication Devices)
- Installation of Terminal Management System
- Overview of the Terminal Management System
- System Startup and Shutdown Procedures
- System Log In and Log Out Procedures
- Configuration of the System
- Various Types of Loading Operations
- Data Relationships
- End of Day Procedure
- Site Security Operation
- System Administration
- Backup Procedures

Terminal Management System Training Using Traditional Presets

Course TA200

Overview

This course provides training to install, configure and perform day-to-day operations for Terminal Management System Revision 8. The training also provides an introduction to Load Rack hardware and teaches the basics of troubleshooting communication problems to peripheral devices. This course is targeted for terminals using traditional presets.

Prerequisite

There are no prerequisites for this course, however prior terminal operation knowledge would be useful.

Topics

- Introduction to Load Rack Hardware (Readers and Communication devices)
- Introduction to Load Rack Hardware (Traditional Presets, Readers, Communication Devices)
- Installation of Terminal Management System
- Overview of the Terminal Management System
- System Startup and Shutdown Procedures
- System Log In and Log Out Procedures
- Configuration of the System
- Various Types of Loading Operations
- Data Relationships
- End of Day Procedure
- Site Security Operation
- System Administration
- Backup Procedures

Terminal Management System Training Using Traditional Presets and DeltaV for Preset Batch Control and Load Rack Monitoring

Course TA300

Overview

This course provides training to install, configure and perform day-to-day operations for Terminal Management System Revision 8. The training also provides an introduction to Load Rack hardware and teaches the basics of troubleshooting communication problems to its peripheral devices. This course is targeted for the system implementers who support end customers for installation and commissioning.

Prerequisite

There are no prerequisites for this course, however prior terminal operation knowledge would be useful.

Topics

- Introduction to Load Rack Hardware (DeltaV Controller, Traditional Presets, Readers and Communication Devices)
- Installation of Terminal Management System
- Overview of the Terminal Management System
- System startup and Shutdown Procedures
- System Log In and Log Out Procedures
- Configuration of System
- Various Types of Loading Operations
- Data Relationships
- End of Day Procedure
- Site Security Operation
- System Administration
- Backup Procedures



To enroll in Terminal Automation courses please call 281-207-2800. For additional contact information refer to the appropriate contact on page 109. Updated dates & locations are available on our website at www.emersonprocess.com/education.

WDPF/WESstation Training

Designed for the latest WDPF™ software (8.7), the WSU, WSM, WHL, WHM, ADM and WES218 courses use the WESstation workstation with the Solaris operating system.

In addition, several courses are available upon request and intended to provide training for earlier versions of the WDPF™ system. Included among these Classic WDPF courses are WDPF System User (SYS), WDPF System Maintenance (SYM), and WDPF 7-Level Maintenance (7LM). These courses are taught using Standard (Classic) consoles that run the iRMX operating system.

www2.emersonprocess.com/en-US/brands/wdpf/training/Pages/index.aspx

Generator Exciter Controls Digital Excitation Systems

With the acquisition of Turbine Control Service Associates, Inc., we offer DGC based excitation systems suitable for a wide range of synchronous generators and exciters driven by virtually any type of prime mover and also for synchronous motors used in pumped storage facilities.

The heart of our excitation system is the Digital Generator Controller (DGC). Designed completely in-house, our engineers have coupled the finest “off the shelf components” with our custom components to create a reliable VME based computer platform on which to operate our sophisticated and flexible software.

The DGC software, operating in the QNX environment, provides all of the features required for precise control and protection of the synchronous machine under normal and fault conditions.

In most applications, the DGC is backed up by an emergency manual control subsystem which providing additional level of reliability such that a loss of the DGC computers will not result in a loss of excitation. Turnkey excitation systems are available with capacity ranges from 10 amps to over 6000 amps.

www2.emersonprocess.com/en-US/divisions/power-water/power_solutions/applications/excitation_systems/Pages/index.aspx

Syncade™ Smart Operation Management Suite



Syncade™ Smart Operation Management Suite is a group of software modules that provide easy, flexible, integrated solutions for resource management, operations optimization, integrated information, and quality and compliance requirements - improving operations performance.

Each software element is modular and scalable; thus enabling the user to address a specific function and then add capability as needed. By using the latest technology and adhering to standards, this solution reduces engineering, testing, and maintenance costs. Syncade suite supports your sustainable manufacturing practices by reducing waste and eliminating paper.



Virtual Classroom Available

Introducing Virtual Classroom, details on page 85. Courses can be arranged to fit your schedule.

On-Site Training can also be scheduled in your area or at your site. Please call to discuss options at 800-338-8158 or 641-754-3771.



Syncade™ Smart Operations Management Suite is a group of software modules that provide easy, flexible, integrated solutions for resource management, operations optimization, integrated information, and quality and compliance requirements - improving operations performance. Each software element is modular and scalable; thus enabling the user to address a specific function and then add capability as needed. By using the latest technology and adhering to standards, this solution reduces engineering, testing, and maintenance costs. Syncade suite supports your sustainable manufacturing practices by reducing waste and eliminating paper.

Syncade™ Suite Overview

Course 7080 CEUs: 1.4



Overview

This 2-day class provides an overview of the Syncade Suite applications and their use within a Manufacturing Execution System (MES) environment. The Syncade Suite applications handle tasks that fit between the process control system environment, such as DeltaV™, and corporate Enterprise Resource Planning (ERP) systems, such as SAP. Each module in the suite will be covered briefly to provide the user with a basic understanding of the module, its functionality and how it fits into the overall MES functional layer. Integration methods and implementation techniques are not part of this class.

Prerequisites

None.

Topics

- Manufacturing Execution Systems (MES)
- Document Control and Authoring
- Security Basics
- Portal
- Training and Development
- Equipment Tracking
- Materials Management
- Inventory Management
- Recipe Authoring
- Order Management
- Weigh and Dispense

Virtual Training Available, Call to Schedule.

Syncade™ Suite Document Control and Archiving

Course 7081 CEUs: 2.1



Overview

This 3-day class provides the user with the necessary skills to set up, configure and maintain the DCA module in Syncade Suite. Students will be taught repository setup and administration settings, how to add documents to a user configured repository structure using manual or automated techniques, manually move documents through the promotion model as well as editing existing documents and making them available to the production cycle.

Users will configure and use the Change Request feature within DCA to move documents through the promotion model. Change request types and workflows will be created and users assigned to the roles in the steps to automate the document promotion process.

Document packages will also be taught in this class. Users will create package classes that will be used to create a print package for a production run.

Prerequisites None.

Topics

- DCA Overview
- DCA User Interface
- Repository Creation, Configuration and Use
- Document Types
- Configured Properties
- Creating Document Properties
- Adding Documents – Manual / Autoloader
- Document Life Cycle
- Document Change Control
- Change Request User Interface
- Change Request Life Cycle
- Change Request Types
- Change Request Workflows
- Creating Change Requests
- Review and Approval Processes
- Document Packages Overview
- Packages User Interface
- Package Classes

Virtual Training Available, Call to Schedule.

Syncade™ Suite Training and Development

Course 7082V CEUs: .7



Overview

This 1-day class will provide the user with the necessary skills to configure the Training and Development module to successfully ensure the workforce is up to date with job related skill sets. Users will configure the tasks and skill sets necessary for an individual to complete a job function as well as maintain those skills over time. Users will configure an organizational structure that will be used to define departments and positions and assign skills to those positions that will set the requirements for a person holding that position. Courses will be created that will teach the tasks required to fill a position in the organization.

Users will also schedule classes and learn how to enroll themselves and others using the training and requirement planners in the TD module.

Users will also be taught how to set up the notification processes within the Syncade Suite administration menus..

Prerequisites

None.

Topics

- TD Overview
- Defining the Organizational Structure
- Creating Tasks
- Creating Skills and Assigning Tasks
- Certification Methods
- Setting Up Training Classes
- Creating Job Requirements
- Integrating TD with Other Syncade Suite Modules
- Maintaining Necessary Job Related Skills
- Administration Notification Processes

Syncade™ Suite Equipment Tracking

Course 7083 CEUs: 1.4



Overview

This 2-day class will provide the user with the necessary skills to create, configure and maintain equipment used in the production process. Users will configure equipment classes and equipment that will provide a solution for managing equipment use, maintenance and calibration information. Events will be set up on the equipment class that define actions that can be performed, or need to be performed, on equipment created from the equipment class. Rules and groups will be configured to assist in implementing controls on equipment and when certain events need to occur. Schedules will be created to set up periodic preventive maintenance and work orders will be created to cover the unscheduled activities that may be needed to fully utilize production equipment.

Prerequisites

None.

Topics

- ET Overview
- Create Equipment Classes
- Define Calibration Targets
- Add Custom Properties
- Create Events and Event State Matrix
- Create Rules and Groups
- Material and Labor with Events
- Event Scheduling
- Create Equipment
- Integrating Documents and Skills
- Performing Events
- Work Orders

Virtual Training Available, Call to Schedule.



Virtual Classroom Available

Introducing Virtual Classroom, details on page 85. Courses can be arranged to fit your schedule.

Syncade™ Suite Materials, Inventory and Order Management

Course 7084 CEUs: 2.1



Overview

This 3-day class will provide the user with the necessary skills to create and manage all types of materials as they flow into, through and out of the production environment during order execution. Users will create material masters to define the material characteristics, create inventory, create and execute orders, allocate materials, create material samples, track lots and containers and perform weigh and dispense activities.

Prerequisites

None.

Topics

- Material/Inventory Management Overview
- OM Overview
- Material Masters
- Material Properties
- Quality Statuses
- Order Creation and Execution
- Material Allocations
- Weigh and Dispense
- Trusted Dispensing
- Sampling
- Purchasing and Receiving
- Lot and Container Actions
- Physical Inventory
- Genealogy
- Inventory Adjustments

Virtual Training Available, Call to Schedule.

Syncade™ Suite Recipe Authoring 4.0

Course 7095 CEUs: 1.2



Overview

This full 3-day class will provide the user with the necessary skills to configure version 4 recipes for Syncade Suite execution. Users will learn to configure manual recipes, DeltaV recipes and recipes that integrate the Syncade Suite and DeltaV into a complete cohesive batch record.

Prerequisites

None.

Topics

- Recipe Authoring (RA) Overview
- RA Application
- Manual and Automation Recipe Hierarchy
- Work Instructions and Parameter Types
- Operations, Unit Procedures and Procedure Creation
- RA Simulator
- Process Segments
- Master Recipes
- Order Execution
- Parameter Referral and Deferral
- Reference Groups
- Formula Creation/Selection
- Behaviors and the Behavior Editor
- DeltaV Recipes
- Integrated Type 2 and 3 Recipes

Note: Detailed application classes available to customers that have purchased Syncade Suite

Virtual Training Available, Call to Schedule.



To enroll in Syncade Suite courses please call 800-338-8158 or 641-754-3771. For additional contact information refer to the appropriate contact on page 109. Updated dates & locations are available on our website at www.emersonprocess.com/education.

PLANT SAFETY



Manufacturers are challenged with making their units last longer and are being required to bring older units up to safety standards, understanding Safety Integrity Level (SIL) ratings and Safety Instrumented Systems (SIS). New technologies available in field devices and control systems can have a significant impact in helping manufacturers comply with OSHA standards for process safety.

Clearly, safety is an area everyone involved in process operations needs to be educated about. In addition to the plant safety that can be derived from knowing how to properly choose, configure and operate automation systems, field devices and other process control elements, basic understanding of the underpinnings of regulatory compliance is critical to operational safety.

Taught by safety experts, these courses provide managers, engineers, and others responsible for plant safety a working knowledge of OSHA standards, process hazard analysis, and the fundamentals of process safety management.



Plant Safety Leading business schools rarely devote time to one of the most necessary and practical aspects of managing any industrial process - employee safety and the safe operation of equipment. Yet, poor safety practices can have a major negative impact on any business enterprise. Emerson Process Management recognizes the importance of management leadership in setting high safety standards and enforcing safety rules throughout every plant. Safety begins at the top, and our expanding offerings in the realm of safety are designed for top operating managers as well as safety professionals.

PSM (Process Safety Management) Fundamentals

Course 2720 CEUs: .7

This one day course is designed for managers, engineers, technicians, mechanics, operators, and other personnel that work in a facility covered by OSHA's Process Safety Management standard.

Overview

If you want to quickly introduce your workers to the OSHA PSM standard this is the course. Participants will learn about each of the 14 elements of Process Safety Management, with special emphasis on Management of Change, Process Hazard Analysis and Pre-startup safety reviews. Each participant will be provided with a work manual to assist in future compliance and the strengthening of PSM program elements that exist in their facilities.

Topics

- The Regulations: Regulation History, Summary, Definitions, Compliance, Interpretations, and Citation Insights
Covered Processes and Application Issues for Both PSM and RMP
- Elements of the Regulations: Employee Participation
Process Safety Information
Process Hazard Analysis
Operating Procedures
Training
Contractors
Pre-Startup Safety Review
Mechanical Integrity
Hot Work Permit
Management of Change
Incident Investigation
Emergency Planning and Response
Compliance Auditing
Trade Secrets
- Hands on Sample Problems Worked During Course

OSHA 10 Hour General Industry Outreach

Course 2722 CEUs: 1.0

This 10-hour course is designed for managers, engineers, technicians, mechanics, operators, and other personnel that work in any manufacturing facility.

Overview

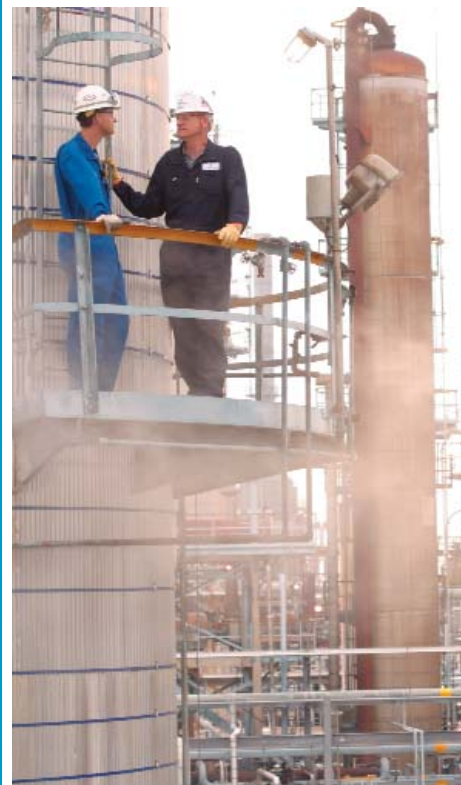
If you want to quickly introduce your workers to the application of OSHA standards in the work environment this is the course. It covers the OSHA standards that are most commonly cited and provides participants with an intensive study of occupational safety and health compliance. The objective is to reduce/ prevent costly, time-consuming injuries/illnesses.

Topics

- Introduction to OSHA
- OSHA and Your Company
- The OSH Act
- General Duty Clause 5 (a) (1)
- Inspections/Citations/Penalties CFR Part 1903
- Subpart D: Walking and Working Surfaces
- Subpart E: Means of Egress/Evacuation
- Subpart H: Flammable/Combustible Liquids
- Subpart I: Personal Protective Equipment
- Subpart J: Lockout/Tagout
- Subpart L: Fire Protection-Emergency Action Fire Teams
- Subpart O: Machine Guarding
- Subpart S: Electrical
- Subpart Z: Hazard Communication

Students completing this course should:

- Discuss OSHA's current emphasis and enforcement policy.
- Describe the OSH Act and 29CFR 1910;
- Identify selected safety and health hazards and OSHA standards;
- Describe abatement methods for selected safety and health hazards;
- Explain and apply workplace inspection procedures consistent with OSHA policies, procedures, and directives.



To enroll in Plant Safety courses please call 512-834-7689. For additional contact information refer to the appropriate contact on page 109. Updated dates & locations are available on our website at www.emersonprocess.com/education.

Plant Safety Leading business schools rarely devote time to one of the most necessary and practical aspects of managing any industrial process - employee safety and the safe operation of equipment. Yet, poor safety practices can have a major negative impact on any business enterprise. Emerson Process Management recognizes the importance of management leadership in setting high safety standards and enforcing safety rules throughout every plant. Safety begins at the top, and our expanding offerings in the realm of safety are designed for top operating managers as well as safety professionals.



Incident Analysis

Course 2728 CEUs: .7

This course is for process safety personnel who participate in or lead incident investigation teams.

Overview

This one-day, instructor-led course uses a combination of lecture, discussion, and hands-on exercises to teach the skills necessary to effectively function as the leader of an incident investigation committee, and to analyze incidents in a systematic manner that assures improvement of the process that generated the incident.

Topics

- ESH Management Theory
- Human Behavior
- The Incident Analysis Process
- Interviewing Techniques
- Practice Cases

Call to discuss pricing at your location

Location **Start Dates**
 Call to Schedule 512-834-7689

Safety Engineering Overview

Course 2730 CEUs:1.4

This course is for project managers, supervisors, and team members who provide supporting roles on a Safety Instrumented System (SIS) Project.

Overview

This 2-day instructor led course covers the Safety Lifecycle, terminology, and an introduction to industry standards such as IEC61508, IEC61511, and S84. Practical examples will cover the analysis, realization and operation of a safety instrumented system.

Topics

- SIS Terminology
- The Safety Lifecycle
- Risk and Probability
- Process Hazard Analysis (PHA)
- Risk Analysis
- SIL Determination
- Reliability Engineering
- SRS and SIS Design
- Start-up and Operation

Call to discuss pricing at your location

Location **Start Dates**
 Call to Schedule 512-834-7689

Safety Engineering

Course 2731 CEUs:2.8

This course is for professionals responsible for specifying and implementing Safety Instrumented Systems (SIS).

Overview This 4-day instructor led course covers the complete Safety Lifecycle. The IEC 61511 standard will be referenced and used as a guide through the analysis, realization, and operation of an SIS. Exercises will include process hazard analysis, SIL determination, SRS definition, and SIF design.

Topics

- SIS Terminology
- The Safety Lifecycle
- Risk and Probability
- Process Hazard Analysis (PHA)
- Risk Analysis
- SIL Determination
- Reliability Engineering
- SRS and SIS Design
- Start-up and Operation

Call to discuss pricing at your location

Location **Start Dates**
 Call to Schedule 512-834-7689

eLearning: Safety Engineering Overview

Course BSE101 CEUs:1.6



Audience

Project managers, supervisors, and team members who provide supporting roles on a SIS project.

Overview

This is a 16 hour on-line course which covers SIS terminology and the Safety Lifecycle, Risk and Probability, Process Hazard Analysis, Risk Analysis, SIL Determination, Reliability Engineering, SRS and SIS Design, and Start-up and Operation.

Note:

Students will have email access to our Subject Matter Experts for the duration of their course subscription. Upon registration you will be sent the email address of these individuals. Any questions you have about the course material can be sent directly to them.

www.emersonprocess.com/education

Quick Links - Click to eStore: Blending Learning

Note: Typical duration of course access is 3 months. Contact education@emerson.com to request an extension.

eLearning: Safety Engineering

Course BSE201 CEUs:3.2



Audience

Professionals responsible for specifying and implementing SIS.

Overview

This is a 32 hour on-line course which provides an in-depth look at the same materials and includes exercises to assist students with learning the course materials.

Note:

Students will have email access to our Subject Matter Experts for the duration of their course subscription. Upon registration you will be sent the email address of these individuals. Any questions you have about the course material can be sent directly to them.

www.emersonprocess.com/education

Quick Links - Click to eStore: Blending Learning

Note: Typical duration of course access is 3 months. Contact education@emerson.com to request an extension.

PlantWeb/DeltaV Introduction

Course 7101 CEUs: 2.1

This course is for individuals needing an introduction to the technology and concepts used in the new generation of process control systems and safety systems.

Overview

Students who complete this 3-day course will be able to:

- use and apply PlantWeb terminology and acronyms
- understand the functions of DeltaV hardware components
- understand the capabilities of DeltaV software applications
- understand the Foundation™ fieldbus technology
- understand AMS Device Manager software
- understand the DeltaV SIS architecture.

Perform basic workstation operations including accessing displays, interpreting faceplates and accessing modules to make process changes, responding to alarms and observing/changing tunable configuration parameters.

Prerequisites

None.

Topics

- DeltaV System Description
- Analog Control Modules
- Discrete Control Modules
- FOUNDATION™ fieldbus
- AMS Device Manager
- DeltaV SIS Overview
- SIFs in DeltaV
- DeltaV SIS Operations

Location

Call to Schedule

Start Dates

800-338-8158 or
641-754-3771

To enroll in Plant Safety call 512-834-7689. For additional contact information refer to the appropriate contact on page 109. Updated dates & locations are available on our website at www.emersonprocess.com/education.

Global Training Center Contact Information

Visit our web page, www.emersonprocess.com/education, for more details.

For pricing and schedules, please contact the respective site in your area of interest.

Latin/South America, Education Contacts**Argentina, Buenos Aires**

Emerson Process Management Argentina.
Av. Maipu 660
(1602) Florida – Vicente Lopez
Buenos Aires – Argentina
E-Mail: cintia.hassan@emerson.com
Phone: + 54 11 4796 7448
Fax: + 54 11 4837 7066
Website: www.emersonprocess.com.ar

Brazil, São Paulo

Emerson Process Management Brazil
Av. Hollingsworth, 325 - Iporanga
Sorocaba 18087-105
SP Brazil
Phone: 55-15-3413-8746
Fax: 55-15-3413-8000
Email: treinamento@emerson.com
Website: www.emersonprocess.com.br

Trinidad, Point Lisas

Process Management Limited
SW Corner Caribbean and Pacific Avenue
Point Lisas Industrial Estate
Point Lisas, Couva
Trinidad, West Indies
Phone: 868-679-0602
FAX: 868-636-8826
Email: renee.milford@pml.co.tt

Mexico, Mexico City

Emerson Process Management, S.A. de C.V.
Calle 10 #145
Col. San Pedro de los Pinos
Del. Alvaro Obregón, México, D.F. 01180
Phone: Cinthia Sólis
Phone: +52 55 5809 5300 x1586
Fax: +52 55 5397-4880
Email: capacitacion.mexico@emerson.com
Website: www.emersonprocess.com/mx

Venezuela, Maracaibo

Emerson Venezuela C.A.
Av. 3E Entre Calles 78Y79, Torre Claret
Piso 6, Oficinas 6-1a6-4
Maracaibo Zuila
Venezuela 4001
Phone: +58-261-300-8104
Fax: +58-261-731-1953
Email: yssvis.valbuena@emerson.com

Costa Rica, Barreal de Hered

Emerson Electricis CR Ltda
Eurocenter II 6th Floor
Frente a Cenada
Phone: +506 25095882 /
Fax: +506 25095884
Email: phil.hunt@emerson.com
melissa.bonilla@emerson.com

Puerto Rico, Guaynabo

Emerson Puerto Rico Inc.
Metro Office Park
Bldg. 8 Suite 300
Guaynabo, Puerto Rico 00968
Phone: 787-782-9955
Fax: 787-782-9574
Carlos.Hernandez2@Emerson.com
or CarlosHernandez@Emerson.com

Europe, Education Contacts**England, Leicester**

Emerson Process Management
Meridian East
Meridian Business Park
Leicester LE19 1UX
Phone: +440-116-282-2217
Email: UKSales@emersonprocess.com

France, Bron

Europarc du Chêne
14, rue Edison B.P. 21
F-69671 Bron Cedex France
Phone: +33 4 721 598 50
Fax: +33 4 721 534 37
Email: kamar.mahi@emerson.com

France, Cernay

Emerson Process Management
Benoit Romain
Rue Paul Baudry BP10150
68701 Cernay France
Phone: +33-389-376-526
Fax: +33-389-376-518
Benoit.Romain@Emerson.com

Finland, Tampere

Emerson Process Management Oy
Hermiankatu 3 33720 Tampere
Finland
Phone: +358 20 1111 200
Fax: +358 20 1111 260
Contact: Risto Wallin
Email: myynti@emerson.com

Germany, Hann

Emerson Process Management GmbH & Co.
OHG
Training Center
Rheinische Strasse 2
D-42781 Haan
Germany
Phone: +49 2129 553 108
Fax: +49 2129 553 100
Email: hansjoachim.szostak@emerson.com

Germany, Hasselroth

Emerson Process Management GmbH & Co.
Trainingszentrum
Industriestrasse 1
D-63594 Hasselroth Germany
Phone: +49 6055 884 472
Fax: +49 6055 884 469
Email: michael.rieth@emerson.com

Italy, Seregno

Emerson Process Management S.r.l.
Via Montello, 71/73
20038 Seregno, MI
Phone: +39-362-228-5325
Fax: +39-362-243655
Email: fiorenzo.giust@emerson.com

Netherlands, Rijswijk

Patrijsweg 140
2289 EZ Rijswijk / P.O. Box 212
2280 AE Rijswijk
Phone: +31 70 413 6794
Fax: +31 70 413 6795
Email: training.nl@emersonprocess.com
Website: www.emersonprocess.nl

**Netherlands, Ede --
Flow BV Training Facility**

Emerson Process Management Flow
Neonstraat 1
6718 WX Ede
The Netherlands
Phone: +31 (0)318 495 446
Email:
arnoud.hazelaar@emerson.com

Belgium, Diegem

Emerson Process Management
De Kleetlaan, 4
B-1831
Diegem
Belgium
32-2-716-77-11
martine.ceulers@emerson.com

Poland, Warsaw

Emerson Process Management
Power & Water Solutions Sp. z.o.o.
11A Konstruktorska Street
Warsaw Poland
Phone : +48-22-458-9159
Fax: +48-22-458-9146
Email: pawel.polecki@emerson.com

Europe, Education Contacts (Continued)

Russia, Moscow

Emerson Process Management
Letnikovskaya st., 10-2, 5 floor
Moscow, 115114 Russia
Phone: +7 (095) 981 981 1
Fax: +7 (095) 981 981 0
Email: grigory.krasnov@emerson.com
Website: www.emersonprocess.com/russia

Spain, Madrid

Emerson Process Management S.L
c/ Francisco Gervas, 1
28108 Alcobendas (Madrid)
Spain
Phone: +34 913586039
Fax: +34 913589145
Email: david.cuadrado@emerson.com

Sweden, Karlstad

Emerson Process Management AB
Lagergrens gata 2
Box 1053
651 15 Karlstad
Phone: +46 54 17 27 00
Fax: +46 54 21 28 04
Email:
Mattias.Mollstedt@emerson.com

Middle East/Africa, Education Contacts

Al-Khobar

Emerson Arabia Inc.
7th Floor Mazen Al Saeed Business
Tower Dammam Khobar Highway
PO Box 3911, Al Khobar 31952
Kingdom of Saudi Arabia
Phone: +9663 8147560
Fax: +96638147570
Email: mirza.baig@emerson.com

Jubail

Emerson Process Management Arabia, LTD
PO Box 10305, Jubail 31961
Kingdom of Saudi Arabia
Phone: +9663 3408650 ext 400
Fax: +9663 340 8791
Email: cobus.dupreez@emerson.com

South Africa, Johannesburg

Emerson Process Management/
Alpret Control Specialists
Cnr. Leader and Hoefyster St.
Stormill, Roodepoort, 1724,
Republic of South Africa
Phone: 27-11-249-6700
Fax: 27-11-474-8368
Email:
alpret.conspec@alpret.co.za

Dubai

Emerson Process Management
PO Box 17033
Jebel Ali Freezone - South
Dubai, U.A.E.
Phone: +9714 8118100
Fax: +9714 8865465
Email: mea.education@emerson.com

Qatar

C/O Doha Petroleum Construction Co.
Alahed Building, Old Salata
PO Box 1744, Doha Qatar
Phone: +974 55897481 / +974 44576705
Fax: +974 44315448
Email: tucker.martin@emerson.com

Asia-Pacific, Education Contacts

Australia and New Zealand

Emerson Process Management
471 Mountain Highway
Bayswater, Victoria
Australia 3153
Phone + 61 3 9721 0200
Fax +61 3 9720 6614
Email:
ANZPSS.Ordersenquiries@ap.emersonprocess.com

Malaysia, Kuala Lumpur

Emerson Process Management
(Malaysia) Sdn Bhd
No. 1, Block A, Jalan SS 13/5,
47500 Subang Jaya,
Selangor Darul Ehsan, Malaysia
Phone: (603) 5638-1010
Email: a.lim@emerson.com

Manila

Emerson Process Management
32/F One San Miguel Avenue Bldg.
San Miguel Avenue cor. Shaw
Boulevard, Pasig City 1600
Phone: +63 2 7021000
Fax: +63 2 7021001
Email:
education.manila@ap.emersonprocess.com
cristina.soriano@emerson.com

India, Bombay, For DeltaV™ DCS Training

Emerson Process Management (I) Pvt.Ltd.
Process Systems & Solutions - Learning Center,
Plot- EL 171, MIDC, TTC Industrial Area,
Mahape, Navi Mumbai- 400710, India.
Phone: (91) 22 67122850
Fax: (91) 22 67122908
Email: rishi.prajapati@emerson.com

PR China, Shanghai

Emerson Process Management
1277 Xin Jinqiao Road
PuDong, Shanghai 201206
Phone: +86-21-28929500
Email: andy.yan@emerson.com

Singapore

Emerson Process Management
Asia Pacific PTE LTD
Educational Services, Singapore
1 Pandan Crescent
Singapore 128461
Phone: (65) 6770 8587
Fax: (65) 6774 6970
Email: Manisah.Amin@emerson.com

Emerson (Thailand) Limited

1/41-43 Rayong Highway No. 3191
T. Huaypong, A. Muang
Rayong 21150 Thailand
Phone: +66(0)38 691353 Ext 3201
Fax : +66(0)38 691976

Korea, SeongNam City

Emerson Process Management
Sicox Tower 12 Floor, 513-514
SeongNam City
Korea 462-806
Phone: 822-2017-4516
Email: soyoung.lim@emerson.com

Singapore, Valves

Phone: (65) 6770 8558
Email - vinodkumar.krishnan@emerson.com

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General Information, North America Education Contacts

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e-mail: Seminars@PetroleumRefining.com
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Cheswick, PA 15024
FAX: 412-826-5441

Machinery Health™ Management: 800-675-4726 or 865-675-2400

e-mail: Mong-Ching.Lin@Emerson.com
Emerson Process Management
835 Innovation Dr.
Knoxville, TN 37932
Fax: 865-218-1411

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e-mail: Education@Emerson.com
Emerson Process Management, Educational Services
PO Box 190/205 South Center Street
Marshalltown, IA 50158-2823
Fax: 641-754-3431

Daniel: 713-827-6314

e-mail: Tech.Service@EmersonProcess.com
Emerson Process Management
Daniel Measurement Services
11100 Brittmoore Park Drive
Houston, TX 77041
Fax: 713-827-6312

Remote Automation Solutions, ROC/FloBoss & ControlWave:

800-395-5497 or 860-945-2223
e-mail: RAS_Training@emerson.com
Emerson Process Management, Educational Services
1100 Buckingham Street
Watertown, CT 06795
Fax: 860-945-2224

Rosemount Analytical: 713-827-6310

email: Ana.Morgan@Emerson.com
Emerson Process Management, Educational Services
5650 Brittmoore Road
Houston, TX 77041
Fax: 713-827-6313

Roxar Flow Measurement: 713-334-2222

e-mail: Info@Roxar.com
Roxar Flow Measurement
3300 Walnut Bend Lane
Houston, TX 77042
Fax: +713-266-0172

Valve Automation: 281-727-5300

18703 GH Circle
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Spartan Controls Ltd.
8403 - 51 Avenue
Edmonton, AB T6E 5L9
Fax: 780-440-8361

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DeltaV® / PROVOX® / ROC & FloBoss / RS3™:

800-338-8158 or 641-754-3771
e-mail: Education@Emerson.com
Emerson Process Management, Educational Services
PO Box 190/205 South Center Street
Marshalltown, IA 50158-2823
Fax: 641-754-3431

Ovation® & WDPF: 800-445-9723 or 412-963-3900

e-mail: Dawn.Smith@Emerson.com
Emerson Process Management
Power & Water Solutions
200 Beta Drive
Pittsburgh, PA 15238
Fax: 412-963-3918

Terminal Automation: 281-207-2800

e-mail: TMS.Support@Emerson.com
Emerson Process Management
12603 Southwest Freeway, Suite #100
Stafford, Texas 77477
Fax: 281-207-2800

Syncade™ Smart Operation Management Suite (pages: 98-101)

800-338-8158 or 641-754-3771
e-mail: Education@Emerson.com
Emerson Process Management, Educational Services
PO Box 190/205 South Center Street
Marshalltown, IA 50158-2823
Fax: 641-754-3431

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512-834-7689
e-mail: David.Shields@Emerson.com
Emerson Process Management, Educational Services
12301 Research Blvd. - Building III
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e - eLearning Course
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Educational Services
205 South Center Street/P.O. Box 190
Marshalltown, IA 50158-2823

Educational Services 800-338-8158/(641) 754-3771
email: education@emersonprocess.com
www.emersonprocess.com/education

