Basics of Electronic Flow Measurement (Instructor-Led Training)

Course Description

This course provides an overview of electronics basics and how they are utilized in the installation and operation of electronic flow measurement (EFM) devices.

Course Prerequisites

- GTA Web-Based Training
  - Communication and Protocols I
  - Communication and Protocols II
  - Basics of EFM
- Instructor-Led Training
  - SCADA

Course Objectives

Upon completion of this course, the student will have received instruction designed to assist him/her in the following:

- Define electronic flow measurement.
- Discuss the primary hardware requirements used for electronic flow measurement.
- Discuss real-time measurement applications.
- Describe a 4-20 mA loop, verification and calibration requirements and procedures, and API Chapter 21 standards for electronic gas measurement.
- Discuss how measurement errors are introduced into a system
- Discuss communications requirements.
- Discuss power system requirements.

Course Outline

1. Basics of Electronic Flow Measurement
    a. Four Categories of EFM Functionality
    b. Valve Input/Output Functions
    c. Error Correction
    d. Process Management
    e. Multiplexing Analog Signals
    f. Analog Inputs and A/D Converters
    g. Signal Conditioning
    h. Noise Considerations
2. Flow Computers
    a. Government Regulations
    b. Flow Transmitter (Multi-Variable)
    c. Remote Terminal Units
    d. Programmable Logic Controller
    e. Distributed Control Systems
    f. Supervisory Control and Data Acquisition
    g. Procedure for Calibration of (Rosemount) Flow Computer
    h. Safe Atmosphere
    i. Meter Calibration Report Forms
    j. Flowing Gas Sample
    k. Beta Ratio
    l. Taking the Temperature Transmitter Out of Service
    m. Calibrating the RTD3
    n. Taking the Static Out of Service
    o. Differential Transmitter 1-5 Volt DC Span (New Connect Only)
    p. Flowing Conditions and As-Found Readings
    q. Troubleshooting
3. Communications
    a. Data Requirements

   b. Open versus Closed Architecture Systems
   c. Centralized Communications
   d. Distributed Communications
   e. Corporate System Communications
   f. Electronic Standards
   g. Contracts
   h. Capacity Release
   i. Nominations
   j. Flowing Gas
4. Invoicing
   a. Power Systems
   b. 480 VAC Power Systems
   c. 120 VAC UPS Power Systems
   d. DC Power Systems
   e. Batteries
   f. Solar Panels
   g. Thermal Electric Generators
   h. Fuel Cells

Recommended Resources

- GTA Basics of Electronic Flow Measurement (EFM) Participant Guide.
- GTA Basics of Electronic Flow Measurement (EFM) Instructor Presentation.
- Internet sites related to Electric Flow Measurement.
- Textbooks or other publications related to Electric Flow Measurement.